

Chemical Age

CHEMICAL
SOCIETY
MEETINGS
(page 671)

VOL. 77 No. 1771

20 April 1957

A RANGE OF VALVES
THAT DEFY CORROSION

Now INCLUDES

THE Y VALVE



Gate Valves

Available in sizes from
 $\frac{1}{4}$ in. to 10 in. bore, all
valves are flanged to
British Standard sizes.

Tank Valves

Disc rising or lowering
bottom outlet valves for
tanks & reaction vessels.

Remote Control Valves

Disc rising or lowering
tank valves with right-
angled control for in-
accessible outlets.

THE STANDARD range of APV-Cooper Stainless Steel Valves has now been extended to include Y Valves in sizes from $\frac{1}{4}$ -inch to 6-inch bore.

These valves, in common with the split-wedge gate and tank valves supplied in thousands by APV to Chemical and allied industries, are precision built and robustly constructed in stainless steels to suit most corrosive conditions.

Incorporating many outstanding design features, APV-Cooper Valves afford smooth, positive control of liquids or gases at pressures up to 150 p.s.i.—and they are produced by Britain's largest manufacturers of equipment in the corrosion-resistant metals.

APV-COOPER
STAINLESS STEEL VALVES

The A.P.V. Company Limited, Manor Royal, Crawley, Sussex.

Telephone: Crawley 1360

APV



WELLS OIL FILTERS

With a Wells' waste oil filter you can use your oil several times over and change it more often. A thoroughly reliable supply of oil is assured with the use of Wells' special filter pads which work in conjunction with Wells' patent syphon feed. The oil delivered from a Wells' filter can be used with complete confidence.

Write for fuller particulars of these filters

Delivery of Oil Filters and Special "Wells' Filter Pads from Stock"

Also makers of

OIL CABINETS, BARREL POURERS & PORTABLE PARAFFIN HEATER PLANTS, SPRAY GUNS & LIME SPRAYERS

A. C. WELLS & CO.

LIMITED

HYDE

Tel: HYDE 953

CHESHIRE

Grams: UNBREAKABLE, HYDE

Thermometers...

HIGH-PRECISION INSTRUMENTS FOR SCIENTIFIC RESEARCH—ANSCHUTZ, CALORIMETER AND SECONDARY STANDARDS.

ZEOL
REGISTERED TRADE MARK

ZEOL
REGISTERED TRADE MARK
EST. 1888

Hydrometers...

PLAIN AND COMBINED FORMS. PRECISION TYPES FOR SPECIFIC GRAVITY, DENSITY AND ALL ARBITRARY SCALES. MADE TO I.P., B.S., S.T.P.T.C. AND A.S.T.M. SPECIFICATIONS.

A.S.T.M. 45F Kin. Vis. Thermometer

Instruments N.P.L. Certified if required

G. H. ZEAL LTD.

Lombard Road, Morden Road, London, S.W.19

PHONE: LIBERTY 2283/4/5/6

GRAMS: ZEALDOM, SOUPHON, LONDON



RM.445

B.G. GRINDING MILL

SIZES FROM 2 TONS TO 25 TONS PER HOUR
LOW CURRENT CONSUMPTION
SILENT OPERATION BY COMPRESSION & FRICTION
NO DUST—COMBINED DRYING
FINENESS UP TO 300 MESH

We can also supply:—

SULPHURIC ACID PLANT

ELECTROLYTIC CELLS

OXYHYDROLISERS

MORITZ

CHEMICAL ENGINEERING CO LTD
204, Earls Court Road, London, S.W.5

Telegrams: Morichemic, London.

Telephone: Frobisher 0769

IPS

Low-boiling alcohol solvents

in two grades—I.P.S.1 and I.P.S.2

IPS



Shell Chemical Company Limited

Marlborough House, 15/17 Great Marlborough Street, London, W.1.
Telephone : GERrard 0666

Sales Office :

LONDON: Walter House, Bedford Street, W.C.2. Tel: Temple Bar 4455.
MANCHESTER: 144-146 Deansgate. Tel: Deansgate 6451.
BIRMINGHAM: 14-20 Corporation Street, 2. Tel: Midland 6954-8.
GLASGOW: 124 St. Vincent Street, C.2. Tel: Glasgow Central 9561.
BELFAST: 35-37 Boyne Square. Tel: Belfast 20081.
DUBLIN: 53 Middle Abbey Street. Tel: Dublin 45775.

INDEX TO ADVERTISERS

The first figures refer to advertisement in Chemical Age Year Book, the second to the current issue

Page		Page		Page		Page		Page	
229	A.P.V. Co., Ltd., The	Front Cov.	227	British Steam Specialties Ltd.	—	280	Douglas, William, & Sons Ltd.	—	
344	Acalor (1948) Ltd.	—	168	British Tar Products Ltd.	—	200	Dowlow Lime & Stone Co., Ltd., The	—	
209	Accrington Brick & Tile Co., Ltd., The	—	170	British Thomson-Houston Co. Ltd.	—		Dring & Fage Ltd.	658	
176	Adequate Weighers Ltd.	—	397	British Titan Products Co., Ltd.	—	174	Drummond Patents Ltd.	—	
223	Aero Research Ltd.	—	231	Broadbent, Thomas, & Sons, Ltd.	—	195	Dryden, T., Ltd.	—	
159	Aimer Products Ltd.	—	244	Brotherhood, Peter, Ltd.	—		Dunlop Rubber Co. Ltd.	—	
	Albany Engineering Co. Ltd. The	—		Brotherton & Co., Ltd.	—		Dutt, P. K., & Co., Ltd.	—	
	Alexander, Herbert, & Co., Ltd.	—	234	Brough, E. A., & Co., Ltd.	—	232	E.C.D., Ltd.	—	
165	Allen, Edgar, & Co., Ltd.	—	218	Browns Foundry Co., Ltd.	—	330	Edison Swan Electric Co., Ltd., The	—	
364	Alumina Co., Ltd., The	—	175	Brush Design Group, The	—	268	Electronic Switchgear (London) Ltd.	—	
328	Amalgamated Oxides (1939) Ltd.	—	180	Bryan Donkin Co., Ltd., The	—		Electrothermal Engineering Ltd.	—	
306	Armour & Co., Ltd.	—	272	Buell (1952) Ltd.	—		B/Mk. Elliott, H. J., Ltd.	—	
G/Cd.	Ashmore, Benson, Pease & Co.	—		Burnett & Rolfe Ltd.	—		Enamelled Metal Products Ltd.	—	
189	Ashworth, Arthur, Ltd.	—	201	Butterworths Scientific Publications	—	166	English Glass Co., Ltd., The	—	
	Associated Lead Mfrs. Ltd.	—		Butterfield, W. P., Ltd.	—	G/Cd.	Erinoid Ltd.	—	
G/Cd.	Audley Engineering Co., Ltd.	—	160	Calder Vale Glassworks Ltd.	688	207	Evered & Co., Ltd.	—	
146	Autometric Pumps Ltd.	—		Callow, F. E. (Engineers) Ltd.	—	208	Farnell Carbons Ltd.	—	
212	B. A. Holland Engineering Co., Ltd., The	—	354	Callow Rock Lime Co. Ltd. The	—		Fawcett Finney Ltd.	—	
282	Baker Perkins Ltd.	—		Candy Filter Co., Ltd., The	—	202	Ferris, J. & E., Ltd.	—	
324	Baker Platinum Division, Engelhard Industries Ltd.	—	238	Cannon (G. A.) Ltd.	665		Fleischmann (London) Ltd.	—	
233	Balfour, Henry, & Co.	—	280	Carbon Dioxide Co., The	—	220	Film Cooling Towers (1925) Ltd.	—	
210	Barclay Kellett & Co., Ltd.	—	243	Carmichael, John R., Ltd.	—	253	Foxboro-Yoxall Ltd.	—	
250	Bennett, Sons & Shears Ltd.	—		Catalin Ltd.	—		Fraser, W. J., & Co., Ltd.	—	
G/Cd.	Berk, F. W., & Co., Ltd.	—		Chapman & Hall Ltd.	—	298	Fuller's Earth Union Ltd., The	—	
242	Beryllium & Copper Alloys (Safety Tools) Ltd.	—	191	Chemical Construction Co.	663	188	Gallenkamp, A., & Co., Ltd.	—	
	Bivac Air Co. Ltd.	—	318	Chemical Workers' Union, The	—	266	Geigy Pharmaceutical Co., Ltd.	—	
270	Black, B., & Son, Ltd.	—		Chemicals & Feeds Ltd.	—		General Electric Co., Ltd.	—	
204	Blundell & Crompton Ltd.	—	284	Chemitrade Ltd.	—		Glebe Mines Limited	—	
148	Borax Consolidated Ltd.	—	203	Chesterfield Tube Co., Ltd., The	—	290	Graviner Mfg. Co. Ltd.	—	
	Borax & Chemicals Ltd.	—	264	Ciech Ltd.	cov. iii	265	Grazebrook, M. & W., Ltd.	—	
289	Boulton, William, Ltd.	—	224	Cinema Television Ltd.	—	164	Greiff, R. W., & Co., Ltd.	—	
228	Bowmans Chemicals Ltd.	—		Clark, T. C., & Co., Ltd.	—	192	Grindley & Co., Ltd.	—	
270	Braby, Fredk., & Co., Ltd.	—		Classified Advertisements 686, 687, 688	—	232	Hackbridge & Hewittic Electric Co., Ltd.	—	
183	Bramigk & Co., Ltd.	—	258	Clayton Dyestuffs Co. Ltd. The	—	202	Haller & Phillips Ltd.	—	
	British Acheson Electrodes Ltd.	—	199	Clayton, Son & Co., Ltd.	—	214	Hanovia Lamps	—	
224	British Arca Regulators Ltd.	—		Clydesdale Chemical Co. Ltd.	685		Hanson Books	—	
217	British Carbo Norit Union Ltd.	—	285	Clyde Tube Forgings Ltd.	—	206	Harris (Lostock Gralam) Ltd.	—	
	British Ceca Co., Ltd., The	—	213	Cole, R. H., & Co., Ltd.	—	222	Haworth, F. (A.R.C.) Ltd.	—	
216	British Chrome & Chemicals Ltd. (London)	659	208	Cole & Wilson Ltd.	—	158	Hearson, Charles, & Co., Ltd.	—	
230	British Chrome & Chemicals Ltd. (Lancs)	—	204	Collins Improved Firebars Ltd.	—	238	Herbert, Alfred, Ltd.	—	
	British Drug Houses Ltd., The	662		Colt Ventilation Ltd.	—		Hickson & Welch Ltd.	—	
	British Geon Limited	—	348	Comet Pump & Eng. Co. Ltd. The	—	193	Holroyd, John, & Co., Ltd.	—	
8	British Industrial Solvents	—		Constable & Co.	—	234	Honeywill & Stein Ltd.	—	
236 & 237	British Laboratory Ware Association Ltd.	—		Controlled Convection Drying Co.	—	248	Hopkin & Williams Ltd.	—	
275	British LaBour Pump Co., Ltd.	—	4	Costain-John Brown Ltd.	—	187	Humphreys & Glasgow Ltd.	—	
240	British Lead Mills Ltd.	—	171	Crofts (Engineers) Ltd.	—	310	Huntington, Heberlein & Co. Ltd.	—	
360	British Railway Traffic & Electric Co., Ltd.	—		Cromil & Piercy Ltd.	688		I.C.I. Billingham Organic	661	
Spine	British Resin Products Ltd.	—	334	Cruickshank, R., Ltd.	—		I.C.I. General Chemicals Florube	—	
172	British Rototherm Co. Ltd. The	—	304	Curran, Edward, Engineering Ltd.	—		I.C.I. Plastics—Darvic	—	
		—	222	Cyanamid Products Ltd.	—		I.C.I. Plastics—Fluon	—	
		—	288	Cyclops Engineering Co. Ltd. The	—		I.C.I. Ltd., (Plastics Div.) Corvic	666	
		—		Cygnat Joinery Ltd.	—		Imperial Chemical Industries Ltd.	—	
		—	286	Danks of Netherton Ltd.	—	157	Imperial Smelting Corporation (Sales) Ltd.	—	
		—	216	Davey, Paxman & Co., Ltd.	—				
		—		Dawson, McDonald & Dawson Ltd.	—				
		—	170	Derby Luminescents Ltd.	—				
		—	161	Dorr-Oliver Co., Ltd.	—				

[continued on page 660]



Established 1725

By Appointment to the
Board of Customs & Excise

Telephones

Hop 3618
Hop 4793

*Hydrometers, Thermometers
Gauging Instruments
and Graduated Glassware*

DRING & FAGE LTD.
150-152 TOOLEY STREET
LONDON S.E.1

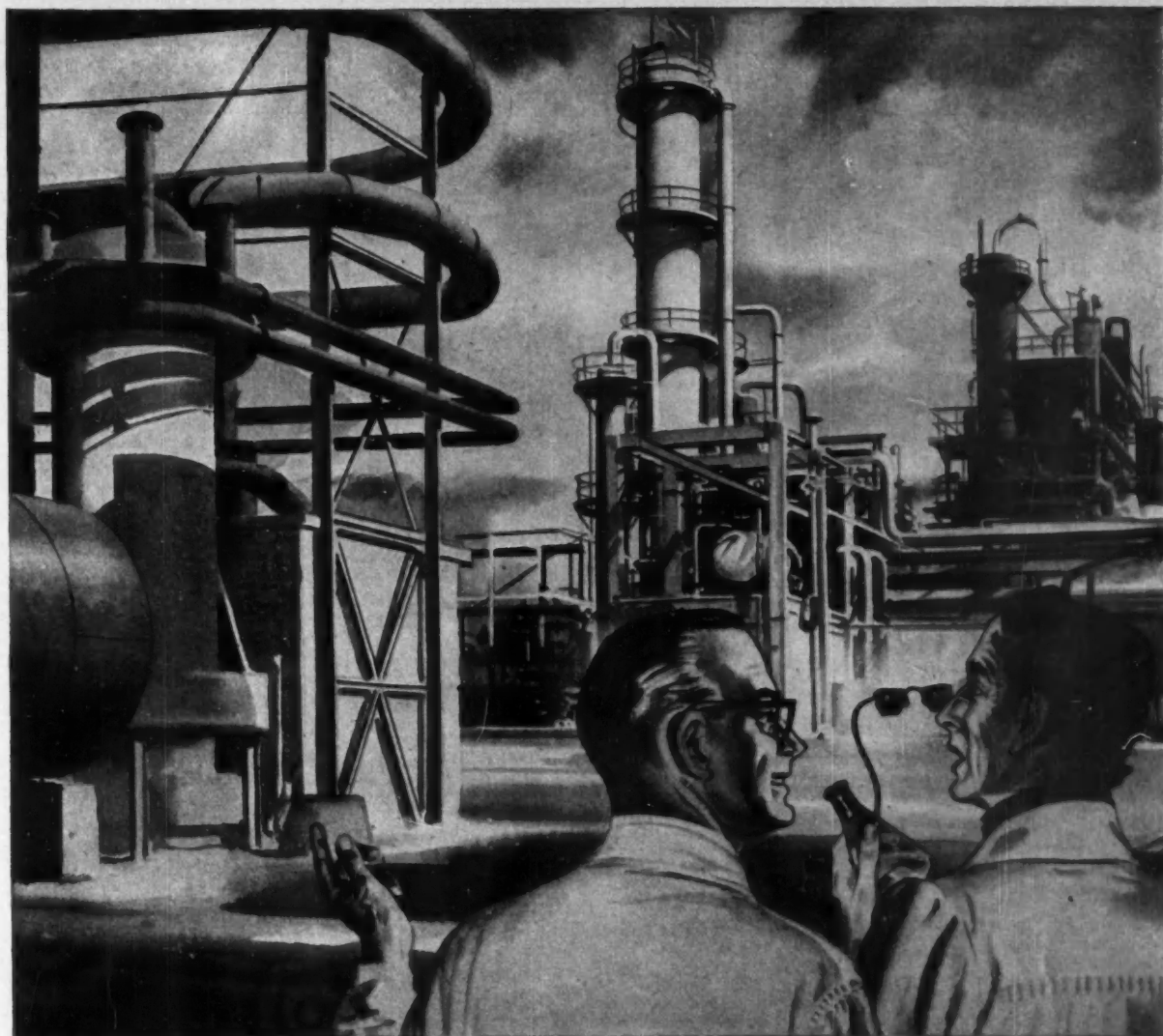
PLEASE SEND FOR OUR LATEST CATALOGUE

KEEBUSH

Keebush is an acid-resisting constructional material used for the construction of tanks, pumps, pipes, valves, fans, etc. It is completely inert to most commercial acids; is unaffected by temperatures up to 130°C; possesses a relatively high mechanical strength, and is unaffected by thermal shock. It is being used in most industries where acids are also being used. Write for particulars to—

KESTNER'S

5 Grosvenor Gardens, London, S.W.1



131 YEARS OF EXPERIENCE...

... lies behind the Chromium chemicals manufactured by B.C.C. The range of application of Chromium chemicals has considerably widened through the years. The Chemical Industry has become a major contribution to industrial progress, behind which lies the continued availability of B.C.C. Chromium chemicals made to the highest standards of purity.

The improvement of existing products and the development of new applications utilising Chromium's inherent properties is the constant aim of the research teams of B.C.C.



Britain's largest manufacturer of chrome chemicals

SODIUM BICHROMATE • ANHYDROUS SODIUM BICHROMATE • POTASSIUM BICHROMATE • AMMONIUM BICHROMATE
SODIUM CHROMATE • POTASSIUM CHROMATE • CHROMIUM SULPHATE • CHROMIUM OXIDE • CHROMIC ACID
The experience of B.C.C. is at the service of the Chemical Industry.

BRITISH CHROME & CHEMICALS LIMITED, EAGLESCLIFFE, STOCKTON-ON-TEES.

Please write to:—

SALES AND LONDON OFFICE: 6 ARLINGTON STREET, ST. JAMES'S S.W.1.

Telephone: HYDe Park 951619 Telegrams: "Chromechem", Piccy, London.

INDEX TO ADVERTISERS

The first figures refer to advertisement in Chemical Age Year Book, the second to the current issue

Page	Page	Page	Page	Page	Page			
International Combustion Group	—	180	Mirvale Chemical Co., Ltd.	—	Simon, Richard, & Sons, Ltd.	—		
Isopad Ltd.	—	254	Mitchell, Cotts & Co., Ltd.	—	344	Southern Instruments Computer Division	—	
246	Jackson, Henry (Liverpool) Ltd.	—	Mond Nickel Co., Ltd., The	—	338	Spencer Chapman & Messel Ltd.	—	
214	Jackson, J. G., & Crockatt Ltd.	—	Monsanto Chemicals Ltd.	—	—	Stabilag Co., Ltd., The	—	
245	Jenkins, Robert, & Co., Ltd.	—	Morgan Crucible Co., Ltd., The	—	396	Stanton Instruments Ltd.	—	
249	Jenkinson, W. G., Ltd.	—	200	Moritz Chemical Engineering Co., Ltd.	cov. ii	—	Staveley Iron & Chemical Co. Ltd.	—
3	Jobling, James A., & Co., Ltd.	—	181	Neckar Water Softener Co. Ltd.	—	212	Steel, J. M., & Co., Ltd.	—
—	Johnson, S. H., & Co., Ltd.	—	268	Nederlandse Emballage Onderneming Gebr. de Wilde N.V.	—	—	Stockdale Engineering Co., Ltd.	—
166	Johnsons of Hendon Ltd.	—	—	Negretti & Zambra Ltd.	—	—	Stonehouse Paper & Bags Mills	688
267	Jones, Tate & Co., Ltd.	—	221	New Metals & Chemicals Ltd.	—	—	Streamline Filters Ltd.	—
228	K.D.G. Instruments Ltd.	—	—	Newnes, George & Co. Ltd.	—	251	Sturge, John & E., Ltd.	—
178	K.W. Chemicals Ltd.	—	276 & 277	Newton Chambers & Co. Ltd.	—	279	Sutcliffe Speakman & Co., Ltd.	—
—	Kaylene (Chemicals) Ltd.	—	239	Nicolson, W. B. (Scientific Instruments) Ltd.	—	235	Taylor Rustless Fittings Co. Ltd.	—
2	Keith Blackman Ltd.	—	177	Nordac Ltd.	—	218	Tenaplas Sales Ltd.	—
278	Kernick & Son Ltd.	—	211	North Thames Gas Board	—	196	Thermal Syndicate Ltd., The	—
395	Kestner Evaporator & Engineering Co., Ltd. (Industrial Safety)	684	194	Northern Malleable Foundry Co., Ltd., The	—	—	Thomas & Bishop Ltd.	—
395	Kestner Evaporator & Engineering Co., Ltd. (Keebush)	658	179	Northey Rotary Compressors Ltd.	—	145	Thomason, W., & Sons Ltd.	684
—	Key Engineering Co. Ltd. The	—	—	NuSwift Ltd.	—	—	Thompson, John (Dudley) Ltd.	—
283	Kier, J. L., & Co., Ltd.	—	296	Palfrey, William, Ltd.	—	—	Todd Bros. (St. Helens & Widnes) Ltd.	—
271	Kleen-e-ze Brush Co., Ltd.	—	—	Paper Goods Manufacturing Co., Ltd.	—	198	Towers, J. W., & Co., Ltd.	—
206	Lankro Chemicals Ltd.	—	—	Pascall Engineering Co. Ltd. The	688	197	Trent Valve Co., Ltd.	—
210	Laporte Chemicals Ltd.	—	6	Paterson Engineering Co. Ltd. The	—	160	Tungstone Products Ltd.	—
184	Lavino (London) Ltd.	—	287	Peabody Ltd.	—	259	Unifloc Ltd.	—
252	Leda Chemicals Ltd.	—	—	Penhryn Quarries Ltd.	—	—	Unilever Ltd.	—
264	Leek Chemicals Ltd.	—	320 & 368	Permutit Co., Ltd., The	—	247	United Coke & Chemicals Co. Ltd.	—
162	Leigh & Sons Metal Works Ltd.	—	G/Cd.	Petrocarbon Developments Ltd.	—	—	United Filters & Engineering Ltd.	—
—	Lennig, Charles, & Co. (Great Britain) Ltd.	—	—	Petrochemicals Ltd.	—	—	United Kingdom Atomic Energy Authority	—
—	Lennox Foundry Co., Ltd.	685	340	Pool, J. F., Ltd.	—	192	Vaughan Crane Co. Ltd.	—
219	Light, L., & Co., Ltd.	—	—	Pott, Cassels & Williamson	662	241	W.E.X. Traders Ltd.	—
274	Lind, Peter, & Co., Ltd.	—	358	Powell Duffryn Carbon Products Ltd.	—	263	Walker Extract & Chemical Co. Ltd.	—
Cover	London Aluminium Co. Ltd. The	—	G/Cd.	Power-Gas Corporation, Ltd. The	—	263	Wallach Bros. Ltd.	—
—	Longman Green & Co. Ltd.	660	169	Price Stutfield & Co., Ltd.	—	161	Waller, George, & Son Ltd.	—
278	Lord, John L., & Son	cov. iv	—	Prodorite Ltd.	—	162	Walley, A. L.	—
190	Machinery (Continental) Ltd.	—	242	Production Chemicals (Rochdale) Ltd.	—	—	Wallis, Charles, & Sons (Sacks) Ltd.	—
257	Mallinson & Eckersley Ltd.	—	261	Pye, W. G., & Co., Ltd.	—	—	Ward, Thos. W., Ltd.	664
—	Manesty Machines	—	—	Pyrethrum Board of Kenya	—	185	Watson, Laidlaw & Co., Ltd.	—
342	Marchon Products Ltd.	—	—	Q.V.F. Ltd.	—	260	Wells, A. C., & Co., Ltd.	—
226	Marco Conveyor & Eng. Co. Ltd.	—	314	Reads Ltd.	—	182	Wengers Ltd.	—
168	Matthews & Yates Ltd.	—	—	Richmond Welding Co., Ltd.	—	217	Whesoe Ltd.	—
—	May & Baker Ltd.	—	G/Cd.	Rose, Downs & Thompson Ltd.	—	196	Whitaker, B., & Sons Ltd.	—
173	Measuring & Scientific Equipment Ltd.	—	230	Rotometer Manufacturing Co. Ltd.	—	163	Widnes Foundry & Engineering Co., Ltd.	—
—	Meigh Castings Ltd.	—	—	St. Helens Cable & Rubber Co. Ltd.	—	—	Wilkinson, James, & Son, Ltd.	—
Cover	Metal Containers Ltd.	—	167	Sandiacre Screw Co., Ltd., The	—	186	Wilkinson Rubber Linatex Ltd.	—
—	Metalfiltration Co., Ltd.	—	269	Scientific Glass-Blowing Co. The	—	273	Willcox, W. H., & Co., Ltd.	—
G/Cd.	Metallack (Britain) Ltd.	—	285	Shaw Petrie Ltd.	—	194	Williams, & James (Eng.) Ltd.	—
174	Metcalf & Co.	—	255	Sheepbridge Alloy Castings Ltd.	—	172	Wilson, Edward, & Son Ltd.	—
—	Metropolitan - Vickers Electrical Co., Ltd.	cov. iv	356	Shell Chemical Co., Ltd.	657	268	Wilde, Gebr. De Nederlandse Emballage Onderneming N.V.	—
178	Middleton & Co., Ltd.	—	256	Siebel, Gorman & Co., Ltd.	—	220	Wood, Harold, & Sons Ltd.	—
215	Mine Safety Appliances Co. Ltd.	—	350	Sigmund Pumps Ltd.	—	184	Worcester Royal Porcelain Co., Ltd., The	cov. ii
—	Mirrlees Watson & Co. Ltd. The	—	—	—	—	—	Worthington-Simpson Ltd.	—
—	—	—	—	—	—	281	Wynn (Valves) Ltd.	—
—	—	—	—	—	—	225	Yorkshire Tar Distillers Ltd.	—
—	—	—	—	—	—	226	Zeal, G. H., Ltd.	cov. ii

PHYSICS

SECOND EDITION

S. G. STARLING, B.Sc., A.R.C.S.C., F.INST.D. and A. J. WOODALL, B.Sc., PH.D.

This comprehensive volume received a warm welcome when it made its first appearance some seven years ago. In its Second Edition it has been thoroughly revised. In one volume it covers adequately the syllabuses for the Pass and General Degree of most universities, including the revised syllabus of the London University B.Sc. (General) Degree. The book also meets the needs of those studying Physics as an ancillary subject. It will be found most valuable of all to those intending to specialise in Physics and they would do well to make its first acquaintance when working for University Scholarships.

Revision of the text has included the insertion of concise treatments of rotatory motion and moments of inertia, additional information on high vacuum work and on electronic devices, and recent developments in Atomic and Nuclear Physics. To facilitate reference to books written in M.K.S. units, conversion tables have been added. Some of this material is given in appendices which serve also to correlate information occurring elsewhere in the main text. An important feature in this edition is the inclusion of suggestions for further reading.

55s. net

LONGMANS

ACETONE**ISOPROPYL ALCOHOL****n-BUTANOL***Availability:*

These high quality chemicals, manufactured at Billingham from propylene produced in the oil-cracking plant at Wilton, are available in road tank-wagons and drums. Stocks are maintained at convenient distribution centres for prompt delivery to all parts of the country.



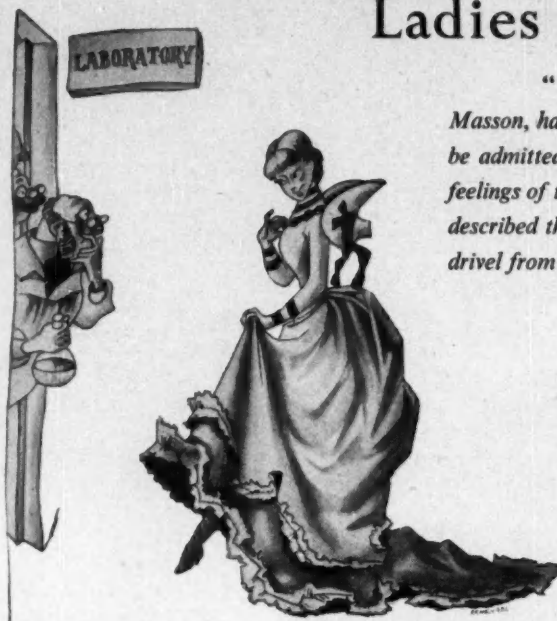
For further information, consult:

IMPERIAL CHEMICAL INDUSTRIES LTD.

LONDON, S.W.1.

Ladies are to be admitted

"The 'Female Physicians' question, thanks to Professor Masson, has made a great stride during the past week. Ladies are to be admitted to study Medicine at Edinburgh University. Imagine the feelings of the non-contents when Professor Masson, in a final outburst, described their argumentation as 'rampageous mysticism, dashed with drivel from Anacreon!'" (Nature, 1869, 1, i, 25)

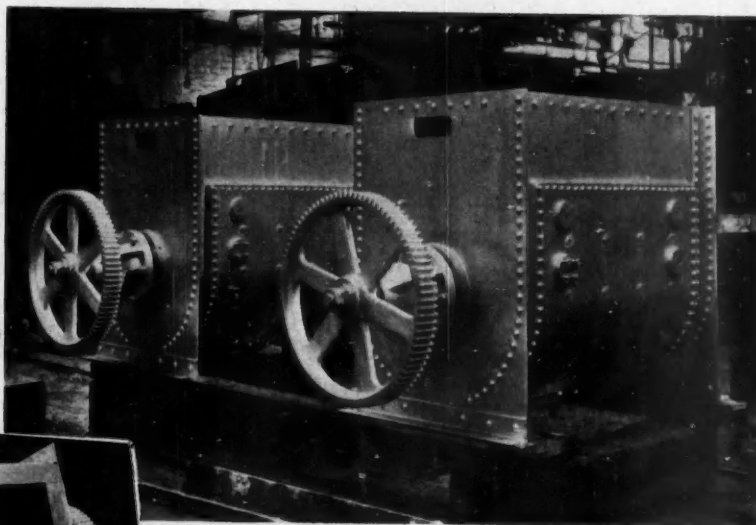
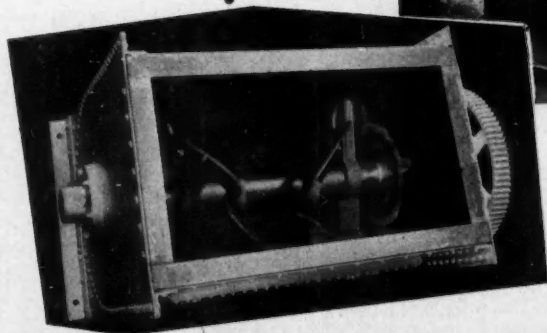


In 1869 scientific clinical methods were nearly as unpopular as women doctors. Today men and women work together in clinical, bacteriological and pathological laboratories all over the world; and in more than seventy countries regard the products of the B.D.H. Laboratory Chemicals Group with equal favour.

B.D.H. LABORATORY CHEMICALS

THE BRITISH DRUG HOUSES LTD. B.D.H. LABORATORY CHEMICALS GROUP POOLE DORSET
LC/P/13at

MIXING VESSELS

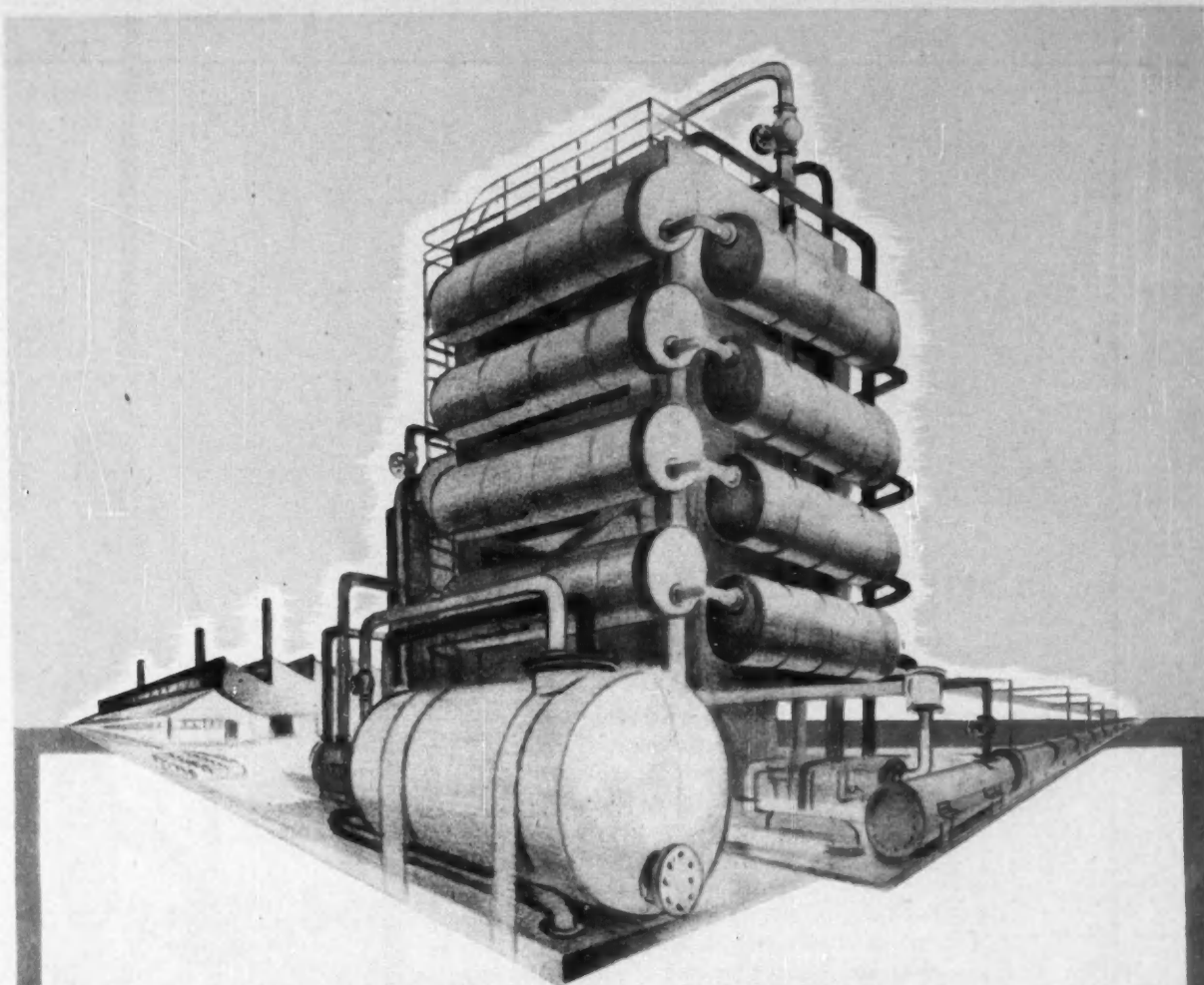


These hot water jacketed Mixing Vessels (capacity $\frac{1}{2}$ Ton each) are for use in chocolate manufacture.

The lower photograph shows the stirring gear.

We manufacture Mixers, Blenders and Process Vessels for a wide range of industries and applications.

POTT, CASSELS & WILLIAMSON • MOTHERWELL • SCOTLAND



New Chemical Plant

Chemical Construction (Great Britain) Ltd, specialise in the entire planning, design, procurement and erection of chemical plant for:

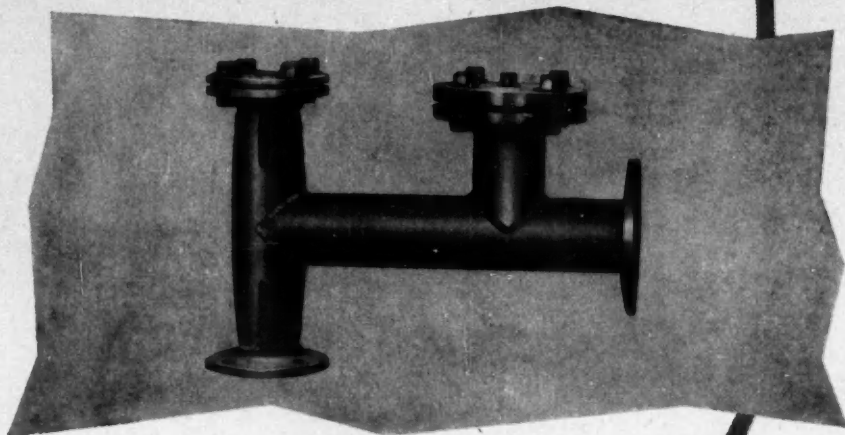
AMMONIA SYNTHESIS • SULPHURIC ACID
NITRIC ACID • AMMONIUM SULPHATE
AMMONIUM NITRATE • UREA, ETC.

In these activities the Company operates in close collaboration with its American associate—Chemical Construction Corporation, New York, and the resources of the two organisations are always at the service of the chemical industry.

CHEMICAL CONSTRUCTION (GREAT BRITAIN) LTD

(Subsidiary of Electric Bond and Share Company, New York)

BUSH HOUSE • ALDWYCH • LONDON W.C.2

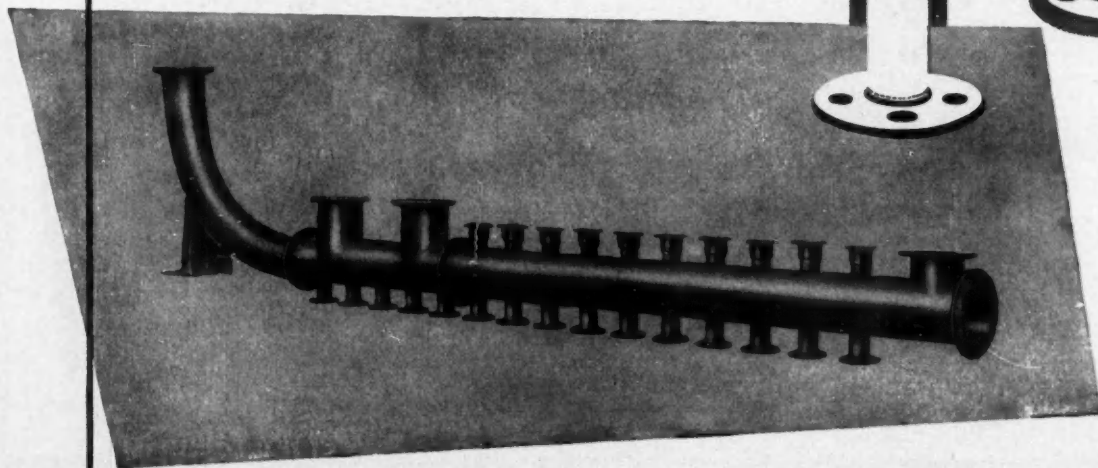


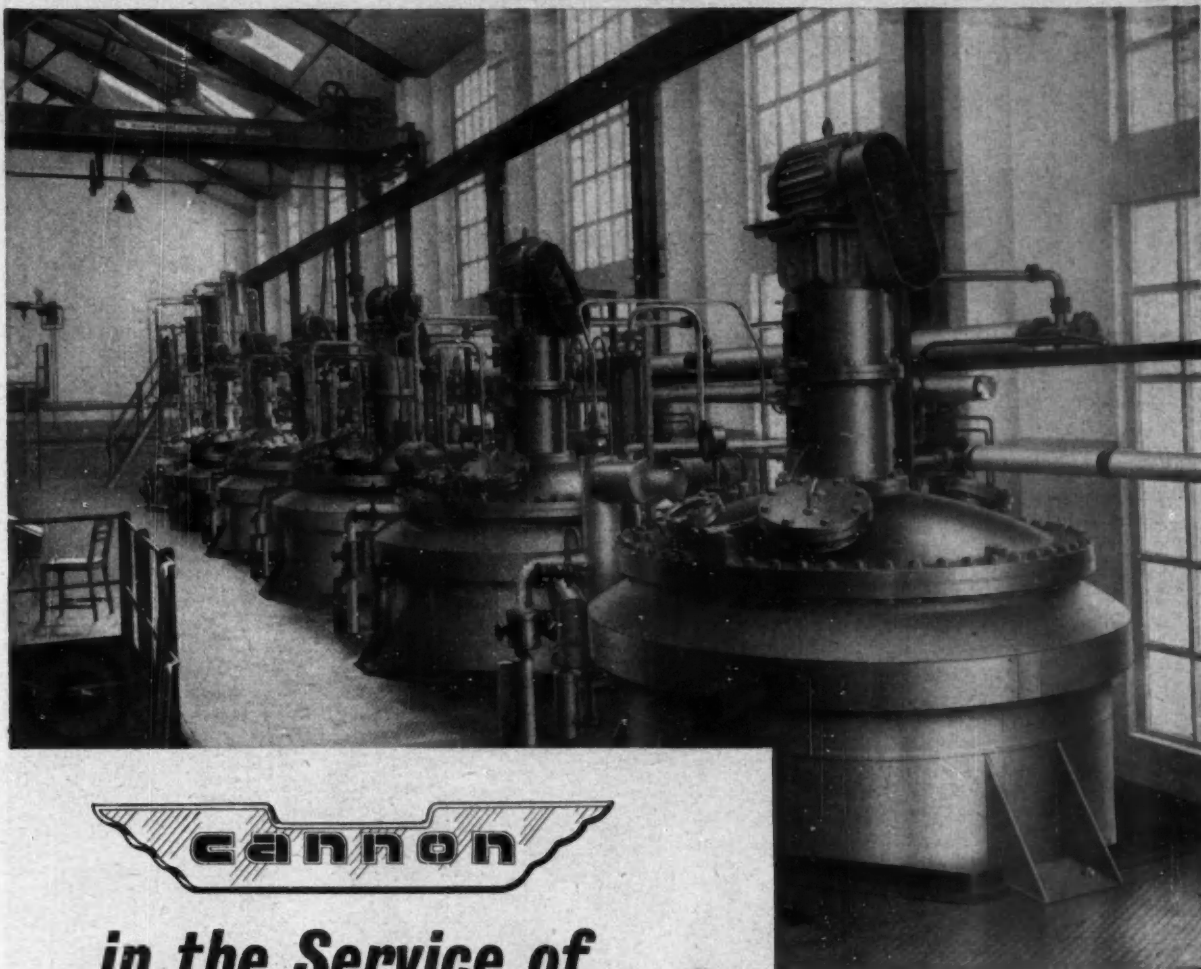
fabricated & manipulated steel tubing

Most pipework systems must be made-to-measure to suit the particular requirements of the installation, and Wards have the experience and the facilities for supplying pipework and tubing specials for all types of steam, air, and water systems.

This is only part of the service that INDUSTRIAL PLANT DEPARTMENT has to offer—a service which includes the construction and supply of such things as jacketed pans, autoclaves, air and steam receivers, coolers, condensers and all manner of static plant for general usage.

INDUSTRIAL PLANT DEPARTMENT
THOS. W. WARD LIMITED
ALBION WORKS, SHEFFIELD. Tel. 26311 (22 lines)
and
BRETENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2.
Tel. TEM 1515





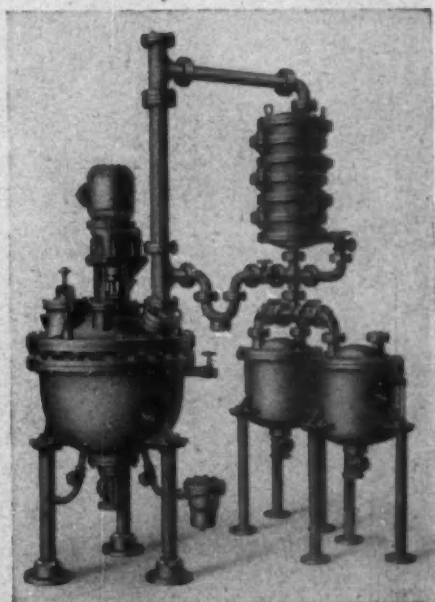
in the Service of Science and Industry

ACID-RESISTING CHEMICAL PLANT

The need for a contamination-free surface in the production of absolutely pure products has created a widespread demand for Enamelled Cast Iron chemical plant of the highest standard of quality—a demand that Cannon is in a unique position to meet.



Behind each piece of Cannon *Acid-Resisting Glass Enamel Lined* equipment there is a century's experience in Iron Founding and Vitreous Enamelling, while up-to-date design and modern production methods ensure rapid delivery of Chemical Plant that will satisfy the most exacting demands of Industry.

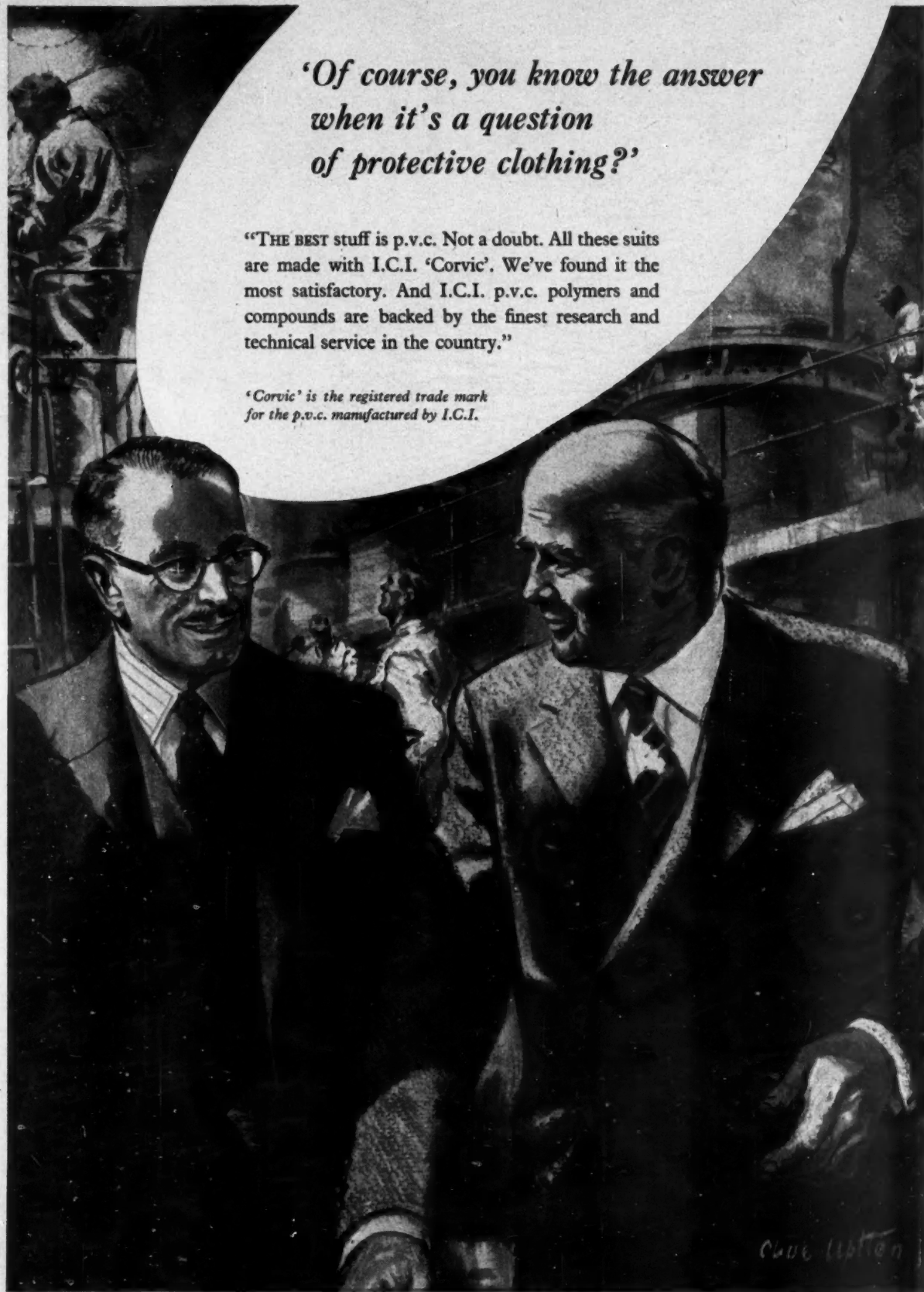


CANNON (CP) LIMITED · DEEPFIELDS · BILSTON · STAFFS

*'Of course, you know the answer
when it's a question
of protective clothing?'*

"THE BEST stuff is p.v.c. Not a doubt. All these suits are made with I.C.I. 'Corvic'. We've found it the most satisfactory. And I.C.I. p.v.c. polymers and compounds are backed by the finest research and technical service in the country."

*'Corvic' is the registered trade mark
for the p.v.c. manufactured by I.C.I.*



IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1



VOL. 77

No. 1971

20 APRIL 1957

Telephone: FLEet Street 3212 (26 lines)

Telegrams: Allangas . Fleet . London

Editor

M. C. HYDE

Manager

H. A. WILLMOTT

Director

N. B. LIVINGSTONE WALLACE

Midlands OfficeDaimler House, Paradise Street,
Birmingham. [Midland 0784-5]**Leeds Office**Martins Bank Chambers, Park Row,
Leeds 1. [Leeds 22601]**Scottish Office**116 Hope Street, Glasgow, C2.
[Central 3954-5]**IN THIS ISSUE**

Common Market Plans	668
Sucrose-Derived Plastics	668
Salary Scales for Chemists	669
Billingham's £1m-a-month Expansion	669
Mr. F. H. Mackenzie Retires	669
Distillates	670
CS Anniversary Meetings	671
Surface Activity Congress	672
Explosives Plant on C & M Basis	672
Fluoroacetamide Plant	673
Overseas News	675
Multi-Factor Problems	677
Courtaulds/Celanese Merger	677
Trade Publications	678
Equipment Review	679
People in the News	681
Commercial News	682
Market Reports	682
New Patents	683
New Boron Compound for UK	684

Annual subscription is 52s 6d (\$7.40),
single copies 1s 3d (by post 1s 6d).

CHEMICAL AGE

BOUVERIE HOUSE • 154 FLEET STREET • LONDON • EC4

WATER SUPPLIES

WATER is the life blood of industry. It is as essential to industrial development as it is to human life. The continued expansion of industries, and particularly of the chemical industry, is giving rise to the problem of water shortage.

Water consumption in Britain since the last war has been growing at a rate of about 2 per cent a year. Consumption by industry has grown more rapidly still; it now takes almost a third of the total daily usage in England and Wales of some 2,000 million gallons against an estimate of about a quarter seven years ago. In fact, estimates suggest that in from 15 to 30 years, the country's demand for water may well be double.

In several areas post-war shifts and growth in industry and population have placed some strain upon local supplies, necessitating schemes to tap more reserves of water from outside. The amount of water taken from the public supply system does not, however, indicate the true total used throughout the country, for industry is using greater quantities obtained from boreholes, rivers, streams and canals. Thus it is estimated that the electricity supply system uses about 15,000 million gallons daily, the steel industry about 350 million gallons and the chemical industry about 800 million gallons. This figure for the chemical industry has risen by more than one-third in the last 10 years and it is estimated that in 10 years' time it will have risen to 1,200 million gallons. Obviously difficulties lie ahead in obtaining enough water to fulfil industry's needs, particularly having regard to the very great requirements of the now expanded nuclear power programme. The 200,000 kW conventional power station uses about 10 million gallons of water each hour for cooling purposes. Calder Hall atomic power station uses 150 million gallons a day, while the new atomic power stations will use about 500 million gallons a day.

A recent memorandum published by the Welsh Economic Development Council (obtainable from the Council, 111 Cathedral Road, Cardiff, price 1s) calls for a water development policy and plan for Wales and the formation of a Welsh Water Resources Council 'to speak for Wales on all aspects of the development of her water resources.' Some 63 per cent of the reservoir capacity in Wales, that is 38,000 million gallons, is owned by English authorities and the remainder, 22,000 million gallons only, is owned by the Welsh authorities.

The memorandum criticises the spending of £20 million on the Trymeryn Valley scheme in providing facilities for the further development of an industrially congested area when facilities are available and unused in a region no great distance from it. As far as nuclear power stations are concerned, these will be sited near the sea or estuaries, but industrial organisations do not appear to choose their sites in relation to water supplies, availability of labour being a perhaps more important consideration. In October 1955, the Minister of Housing asked the Central Advisory Water Committee to advise on the supply of and demand for water. As a result two sub-committees were appointed; one to survey the country's water needs and the other to consider the extent to which demand was increasing and the cost of meeting it.

Unfortunately neither sub-committee has concluded its task. Undoubtedly the second sub-committee has been handicapped by the lack of information about water usage in this country. The public supply system is, for instance, in the hands of about 1,250 separate undertakings hence the difficulties of obtaining figures of water consumption. With regard to industrial usage, however, since supplies are drawn from bore-holes, rivers etc., it is difficult to say how much water is obtained outside the public supply.

At the present time public water supply is described as adequate with overground capacity giving about three month's supply of water. But if no measurable rain falls for periods of more than 15 days, drought is proclaimed. Should a drought similar to that of the 30's arise, industry in some areas may well be forced to a standstill.

Recently there have been reports of falling water tables, particularly in the London Basin, since replenishment is not at the same rate as extraction. Fortunately, there are large underground reserves of water which can be exploited. This is not the case in some US areas, where alleviation of drought is now being given close attention. The US Interior Department is now studying a plan to use atomic energy to make fresh water out of salty ocean water, and recently the US Weather Bureau's Chief of the Hydrological Division stated that 30 million acres of parched land in 15 States could be irrigated with water pumped there from hundreds of miles away by atomic power plant.

The chemical industry is not only a user of water. It is assisting in attempts to conserve supplies in tropical regions where losses from evaporation are considerable. The Commonwealth Scientific and Industrial Research Organisation in Australia has developed the Mansfield method in which hexadecanol (cetyl alcohol) is used to form a thin film over the surface of the water in a dam.

Price's (Bromborough) Ltd. have recently announced that they supply hexadecanol to CSIRO standards (certification mark Si-Ro-Seal). Their method is subject to patent applications throughout the world and they claim that their material is the first to be awarded the Si-Ro-Seal.

COMMON MARKET

THERE is much speculation in the US at present regarding the long-term effect of the agreements entered into by France, West Germany, Italy, Belgium, the Netherlands and Luxembourg for the West Europe common market plan and Euratom, particularly as to US trade relations with the participating countries and to industrial life.

Undoubtedly what has surprised the US is the speed with which the nations have acted (Euratom and common market plans have been discussed for some 18 months) culminating in treaties being signed in Rome on 25 March.

Questions at present being asked in the US dwell on how these agreements may affect industrial life in the participating countries and US trade relations with them. According to Walter J. Murphy, editorial director of the American Chemical Society's applied journals (*Chemical and Engineering News*, 1957, 38, No. 13), American chemical and pharmaceutical industries are very interested in these developments for obvious reasons.

A US top chemical executive asked to comment on the matter, suggests that as the standard of living in Europe will rise, there will be greater consumption of chemicals and allied products, particularly as trade and tariff barriers would be removed. The West European nations are also seen as being less dependent on the sales of chemicals in foreign markets.

Construction of larger production units located in areas dictated by economics, manufacturing and distributing costs are envisaged, which should thus lead to lower prices.

This will, according to this executive, influence American

chemical companies when erecting future plants in West Europe, either wholly owned or through corporate alliances with West European capital. Moreover, he believes there would be more such alliances in the future than in the past, which should assist exchange of knowledge and knowhow.

Less dependence on cartel agreements in Western Europe is considered likely. A further point of interest is the belief that difficulties associated with excess productive capacity may well cease to exist when a common market is created.

In the UK the need for some kind of British participation has been quickly appreciated, although there is still concern over two different types of problem—the details of the European Free Trade scheme and the most likely consequences for different countries and industries. These problems are discussed at some length in the *Survey of 1956*, which has just been published by the Economic Commission for Europe. Gains that have been stressed by Government and business spokesmen are the advantage of a mass market of up to 240 million people in promoting mass production of low-cost goods and the gains arising from the concentration of each country on the goods it can produce most efficiently. A warning is sounded, however, that in some cases the unified tariff of the Common Market may distort rather than free the pattern of trade.

This report suggests, in fact, that the Free Trade Area emerges with advantages over the Common Market plan.

SUCROSE-DERIVED PLASTICS

IN DECEMBER LAST, sucrochemistry was discussed in *CHEMICAL AGE* (15 Dec., 1956, pp. 441 and 443). Now from the US has come news of the results of the plastics-from-sugar programme sponsored by the Sugar Research Foundation and carried out by Bjorksten Research Laboratories for industry.

A family of sucrose phenol-formaldehyde resins reported in June of last year is now stated by Hass of the SRF to compare favourably with conventional phenol-aldehyde resins, and perhaps more important still is that the cost of making these sucrose resins is likely to be very much lower.

According to available information granulated refined sucrose is reacted with a phenolic compound (phenol, *m*-cresol and resorcinol) and formaldehyde. Because of greater reactivity with polyhydroxy compounds, some slight modifications may be necessary in the reaction conditions employed. An alkaline catalyst is used.

It is of interest to note that in the new polymers, sugar is bonded in whereas past work indicated that resins were produced where the sugar was dispersed. Also, the new resins can contain up to 50 per cent sucrose and yet still have properties identical to resins containing less sugar. Above 60 per cent content of sucrose, the resin becomes too sensitive to moisture.

Uses for these new plastics from sugar are as laminating adhesives. Flexural strength is stated to approach that of conventional phenol-aldehyde resins, colour ranges from colourless to a light tan in thin films while thicker sections range from yellow to red. Of especial interest is the finding that static electricity charge is not built up.

Sucrose urea-formaldehyde resins can also be made but do not, at present, produce such a good product as the phenol types. The urea reactions have proved difficult to control. However, investigations on the sucrose urea-formaldehyde are continuing.

Also under investigation at Bjorksten is the possibility of preparing sucrose-derived resins starting from 90 per cent pure sugar or molasses instead of refined sugar. If successful, the cost of making 'sugar' plastics would be still further reduced.

Increases Shown in New BAC Salary Scales

SOME increases compared with last year's figures are contained in the recommended scale of minimum salaries for chemists and chemical assistants, published by the British Association of Chemists.

For senior chemists with posts carrying exceptional responsibility a salary of at least £2,000 is suggested. Posts at executive level are in the range of £1,350 to £2,000, as against £1,250 to £2,000 last year.

Salaries for qualified chemists are almost unchanged from last year. A man or woman with a university degree, A.R.I.C., M.B.A.C., or equivalent qualification plus one year's subsequent experience and age not less than 25 should get a minimum of £750 a year rising by increments of not less than £60 a year for 10 years, compared with eight years.

Rates for qualified chemists who have no post-graduate experience are: £510 a year at 21, £570 a year at 22, and £630 a year with increments as above at 23 or over.

Holders of the Higher National Certificate in Chemistry should be paid as follows: Age not less than 25, £630 a year rising by increments of £50 a year to £1,100, thereafter according to merit; age less than 25, £530 a year with increments as above.

Chemical assistants with Intermediate B.Sc., Ordinary National Certificate, or similar qualification plus four years' experience and age not less than 21 should get £475 a year with increments of £30 a year for at least eight years. With less than four years' experience and age not less than 19 years the rate should be £425 a year with two increments of £25 a year.

Rates for laboratory assistants and junior laboratory assistants have been increased by 5s (in some cases 10s) a week.

When asked about the value of these recommended scales a representative of BAC said that they had aroused considerable interest. Many companies regarded them as a basis for negotiation. He further pointed out that many companies paid more than the recommended minimum.

US Oxygen Company to Operate in Britain

ORGANISATION of a company to be called British Air Products is announced by the Butterley Co. and Air Products Inc., the leading oxygen company in the US.

The new company will engage in the manufacture of extreme low temperature equipment and the production of industrial gases in the UK, British Commonwealth and Europe.

The Butterley company began producing a range of oxygen generators under licence from Air Products about six years ago. The plant enables users to produce their own supplies on the site of high-purity oxygen for industrial uses such as welding, or steel-making, or for medical purposes.

ICI's BILLINGHAM EXTENSIONS ARE COSTING £1 MILLION A MONTH

CAPITAL extensions by the Billingham division of Imperial Chemical Industries Ltd. are costing £1 million a month, stated Mr. W. K. Hall, Billingham works general manager, at the recent annual dinner for Heysham and Clitheroe foremen.

At the present cost of chemical factories, these extensions should provide permanent employment for an extra 50 to 100 men each month. In the chemical industry today, it cost between £10,000 and £20,000 to provide permanent work for each additional employee.

Mr. Hall mentioned that the company's shareholders had recently put another £40 million into the organisation and, although that represented about the largest loan ever floated by a public company on the Stock Exchange, it did not go very far with ICI. If they had to depend on shareholders for providing money to keep the business expanding, ICI would have to curtail its activities quite a bit.

During the past three months, Billingham division had been spending £1 mil-

lion each month on capital extensions and that rate would be continued for some time. Thus with Billingham spending between £12 and £13 million a year on capital extensions, and with other divisions also busy with extensions on a somewhat similar scale, that £40 millions would not be sufficient in itself.

He was pleased to note that a decision had been made to start an extension at Heysham where two ammonia oxidation plants were to be built to provide nitric acid for the Nitro-Chalk plant extension. That would mean that Heysham would no longer depend on Billingham for supplies of nitric acid and would not need to send ammonia to Billingham.

At the dinner were Mr. E. Beesley, Heysham works manager and Trimpell general manager, who presided, Mr. J. D. Brown, Billingham division deputy chief engineer, Mr. A. F. L. Bowley, division staff manager, Dr. C. J. Bridger, external factories manager, Mr. M. Willcocks and Mr. E. Fay of Shell Refining and Marketing Co. Ltd.

F. H. Mackenzie Retires after 45 Years with Boake, Roberts

AFTER MORE than 45 years' service with the company, Mr. F. H. Mackenzie, a director of A. Boake, Roberts and Co. (Holding) Ltd., London E15, and its main subsidiary, A. Boake, Roberts and Co Ltd., has retired.

Mr. Mackenzie joined the company as an analytical chemist in 1912 and after war service was transferred to the sales side of the business. Much of his time was devoted to the sale of fine chemicals and, over the years, he made a substantial contribution to the development of these products. He was responsible for the first exhibitions of ABRAC fine chemicals at Manchester in 1918 and at the Loire de Lyons in 1920 and later organised the company's exhibits at the British Industrial Fairs until 1948.

Appointed to the board in 1946, Mr. Mackenzie concerned himself primarily with the technical applications of ABRAC products and the developments of new materials. He instigated the formation of the company's technical service department and laid the foundations for what is now the products development department.

For many years he was actively concerned with the technical committees of various trade organisations and of major importance was his continued membership of the fine chemicals committee of the Association of British Chemical Manufacturers (he was committee chairman between 1951 and 1954). He was also chairman, representing the ABCM, of the fine chemicals industry committee of the British Standards Institution. In addition he was a member of the BSI committee on nomenclature for the fine and heavy chemicals industries, which

under his chairmanship was responsible for the production of BS 2474/1954—'Recommended names for chemicals used in industry'.

Mr. Mackenzie relinquished his executive responsibilities with the company in 1954 but retained his directorships until his decision to retire this year.

International Congress to be Held in Athens

THIRTEENTH *Congrès International de Chimie Industrielle* will be held in Athens from 17 to 24 September. It is expected that it will attract many chemists from all over the world. A full programme of lectures, works visits and excursions is being arranged.

The *Congrès* takes place every year and are organised by the *Commission Permanente d'Organisation des Congrès Internationaux de Chimie Industrielle*. This year there will be 20 sections ranging from analytical chemistry, plastics and agricultural chemistry, to the history of chemistry.

Address of the organisers is XXX^e *Congrès de Chimie Industrielle*, Comité d'Organisation, 10 rue Kaningos, Athens, Greece.

Esso Chemical Contract for Foster Wheeler

Mechanical design and construction work for the Esso Petroleum petrochemicals plant being built at Fawley is to be handled by Foster Wheeler. This plant was referred to in last week's *CHEMICAL AGE*, page 635.



★ **MAKING** her debut on BBC TV last Saturday was Miss Susan Hampshire, 18 year old daughter of Mr. George K. Hampshire, chairman of the general chemicals division of Imperial Chemical Industries Ltd. Miss Hampshire had a 'walking-on' part in the children's serial 'The Appleyards'. She will have a bigger part in next Saturday's edition.

She began her acting career last year and played the lead in the Christmas production of the Oxford Playhouse, 'The Heartless Princess'. She is following in her mother's footsteps, for Mrs. Hampshire was an actress before starting the drama school in Knightsbridge, which she still runs.

★ **THE** production of Harris tweed is threatened through lack of two vital chemicals for dyeing—potassium dichromate and sodium dichromate. Three mills on Lewis say they are unable to obtain further supplies and have almost exhausted their present stocks.

The chemicals are used in the production of brown and black dyes for Harris tweed, colours used in almost all tweeds exported to the American market. The mills are enlisting the aid of the Highlands and Islands Committee of the Scottish Board of Industry and the Board of Trade.

★ **HOSPITALS** in the north-west are currently testing a new anaesthetic, Fluothane, as a potential successor to ether and chloroform. The drug is expected to be perfected at the ICI Blackley laboratories within the next few months. It is claimed to be more powerful than either ether or chloroform and to have hardly any after-effect and to be non-inflammable. Deep sleep is produced, very rapidly.

★ **ALLEGATIONS** of 'running warfare' between Barking council and the Chemical Supply Co. Ltd., Abbey Road, Barking, were made at a recent two-day public inquiry at the Town Hall. The company was appealing against the refusal of the Essex County Council to grant permission for the development of its present site and against the refusal of Barking council to allow the works chimney to be extended by 20 feet.

A surveyor, for the company, said there had been a certain amount of 'running warfare' and he thought the company's position had become intolerable. The company's counsel said that £10,000 had been spent on installing new boiler equipment which would cut down smoke emission; it could not be brought into use until the chimney had been extended.

The South-west Essex planning officer spoke of plans to build new houses and added 'Removal of this factory is the

whole crux of the matter'. It was stated that the local council had in mind the acquisition of the land on which the plant now stands.

★ **STROLLING** down Southend pier last week, Alembic watched tests being carried out with a new chemical compound which it is hoped will solve the problems of corrosion to pipelines and other metal structures. Entitled Resilone RE, this product has an interesting composition. Mr. Harold Lee and his research team who developed the product for Strongwork Products Ltd., a subsidiary of Remma Construction, were impressed with the belief firmly held by pier maintenance staff that barnacles play an important part in the anti-corrosion fight.

Extensive tests established that this was so and Resilone RE, which grew out of Resilone CY, a Remma flooring compound, is based on bariaclases, fibreglass, cement, an oxide and a special binder. The resulting compound has been tested over the past five years and the latest series of investigations now being carried out on Southend pier are the most rigorous yet for they are exposing the product to a combination of sea water, atmosphere and the corrosive estuary mud.

Mr. Lee told Alembic that a major oil company is already interested in the product as a means of reducing the cost of maintenance at refineries and on pipelines.

★ **LEADER** of the mission which recently returned from the Soviet Union with an order for a tyre factory costing 'many millions of pounds' was Dr. J. G. MacKay, a chemist in the rubber industry for nearly 30 years. The mission, which included two Dunlop representatives, was sponsored by the advisory service of the Dunlop Rubber Co. Ltd.

Dr. MacKay, works director of the Avon India Rubber Co. Ltd., is chairman of the Research Association of British Rubber Manufacturers and a member of the board of the British Rubber Producers Research Association. He was a Vans Dunlop Scholar at Edinburgh University.

★ **WHY** IS IT that women in industry seldom have ideas for their firms' suggestion schemes? That question was asked, but not answered, at a recent Birmingham conference on 'Suggestion Schemes' organised by the Industrial Welfare Society. It was stated that no major ideas award had ever gone to a woman. Mr. W. R. Taplin, secretary of the ICI Metals division, Witton, said that less than 10 per cent of the 3,000 suggestions made each year at the division came from women, although women comprised half the total labour force of 7,000.

The fairer sex came in for further criticism when Professor G. E. Cox, professor of chemistry at Leeds University, said that more girls should be trained to become scientists. Speaking at Middlesbrough Girls' High School speech day, he said that the biggest single means of increasing the output of scientists, of whom there was a 'desperate shortage' was to get more from the girls' schools.

But at least the housewife deserves a medal. Gloucestershire Women's Institute members are responding to facilities for them to study science at special courses at Denham College.

★ **PLANS** of Murphy Chemical Co. Ltd., insecticide manufacturers, to demolish the sixteenth-century Wheathampstead Place in Station Road, Wheathampstead, Herts, and replace it with an office building, have aroused a storm of controversy. At present Wheathampstead Place, scheduled as a building of historical interest, houses the company's biological laboratory.

The St. Albans rural council surveyor said that while the council would much prefer to retain the building, they would not be prepared to spend public money on preserving it. There was little left of the interior worth preserving. Most of the objections to the proposal were lodged on the grounds that the building occupied a commanding site and its demolition would alter the character of the village.

★ **AN INTERESTING** sidelight on the modern world's sense of values is provided by an examination of the finances of the Norwegian football pools. Introduced into Norway for the benefit of sport and science, the pools pay out half of the stakes received as prize money. Profits are then divided between sport and science. Last year's profits amounted to 31 million kroner of which sport received 22.8 million kroner and science 8.2 million kroner. Although loaded heavily in favour of sport, the situation is better than in this country where, as far as Alembic is aware, very little football pool money goes to sport and certainly none to science.

★ **A CORRESPONDENT** has kindly drawn Alembic's attention to two books that refer to the use of Princetown Prison, Dartmoor, as a chemical factory (Distillates, 6 April, p. 600). First from *Ure's Dictionary of Arts, Manufactures and Mines*, seventh edition, 1875: 'Attempts were made here (Dartmoor) many years since to distil the peat for naphtha, paraffin etc., but the experiments not proving successful, the establishment was abandoned'.

S. Rowe in his *Perambulation of Dartmoor*, 2nd ed., London, 1856, p. 302, said '.... the project for subjecting the peat with which the immediate neighbourhood abounds, to chemical processes for the production of naphtha, and other substances, has been carried on for some time, with results which promise to remunerate the enterprising proprietors of the works'.

Alembic

CHEMICAL SOCIETY ANNIVERSARY MEETINGS AT CAMBRIDGE

Prof. Brockmann Gives Centenary Lecture

THIS year the anniversary meetings of the Chemical Society were held in Cambridge from 9 to 12 April. About 500 Fellows and guests attended.

Three symposia were held during the period of the meetings. These were Organic: Phosphoric esters and related compounds; Physical: Reactions of free radicals in the gas phase; and Inorganic: Recent aspects of the inorganic chemistry of nitrogen.

Chairmen of the sessions were: Organic—Sir Alexander Todd, Professor M. Stacey, Dr. F. G. Mann and Professor F. Bergel; Physical—Professor C. E. H. Bawn, Professor R. G. W. Norrish, Professor W. Jost and Dr. H. W. Melville; Inorganic—Professor H. J. Emeléus, Professor W. Wardlaw and Dr. Fairbrother.

The presidential address, given by Professor E. L. Hurst, was on 'Some aspects of the chemistry of the fructosans'. It was a masterly account of a very involved subject.

The Centenary Lecture was delivered by Professor Dr. H. Brockmann. His subject was 'Photodynamically-active natural pigments'.

Visits Arranged

Visits to the University Chemical Laboratory and the Physical Chemistry Department and to companies located in and around Cambridge, were arranged. These were as follows:

Aero Research Ltd., Duxford, where visitors saw the factory producing formalin and urea-formaldehyde and melamine-formaldehyde resins.

At W. G. Pye and Co., and Unicam Ltd., Cambridge, the factories and research laboratories were visited and at Unicam Ltd. (a company associated with W. G. Pye and Co.) a demonstration was given of their double-beam recording infra-red spectrometer with grating equipment and also a recently developed flame photometer.

Fisons Pest Control Ltd., Chesterford Park, illustrated their investigations of insecticides, herbicides and fungicides. Chemical development and biological evaluation are carried out on the surrounding farm.

Cambridge Instrument Co. Ltd., who have just celebrated their 75th anniversary in Cambridge, showed examples of their latest types of instruments. (See CHEMICAL AGE, 23 March, p. 501.)

Visitors to Tube Investments Ltd. Research Laboratories, Hinxtun Hall, near Saffron Walden, saw work associated with the two million volts Van de Graff machine and aspects of research in progress.

Processing of filaments for hosiery was shown from start to finish by Kayser Bondor Ltd., Baldock.

The factory of the well-known producer of conserves, Chivers and Sons Ltd., Histon, was toured with the associated laboratories.

In order to permit as many Fellows as possible to attend the Anniversary dinner, the dinner was held in two parts, at Trinity College and at Queens' College. Both dinners were of equal status. The president of the Society, Professor E. L. Hirst, took the chair at Trinity College and the immediate past-president, Professor W. Wardlaw, was in the chair at Queens' College. Professor H. Brockmann proposed the toast to the Chemical Society at Trinity College, and Professor F. H. Westheimer at Queens'.

In his reply to the toast by Professor Brockmann, Professor Hirst referred to the kindness and hospitality extended to chemists in Germany (Professor Brockmann's country). He went on to say how pleased he was that the society's anniversary celebrations were taking place in a town which was so deeply associated with chemistry. He thanked both the Mayor of Cambridge, Councilor C. E. Ridgeon and Lord Tedder, The Chancellor of the University, for helping to make the meeting so successful. In addition industrial friends of the society in Cambridge had 'heaped kindness on the Chemical Society'.

Professor Hirst said it was stimulating to see chemistry flourishing so strongly in Cambridge. It was in 1702 that the first chair of science had been established there.

The Professor then remarked that the society's journal was experiencing difficulties. Firstly, there were rising printing charges and secondly, there was the problem of publication of the many research papers. There were now many research papers being produced and these would undoubtedly be increased with the rising numbers of research workers. He expressed the hope that something could be worked out, perhaps with the help of the industrial companies.

It was reported by the president that the number of Fellows of the society had been well maintained. Plans at Burlington House, the society's headquarters, had now come to fruition with the library and lecture rooms, which were

more in keeping with the status of the society.

Of the anniversary meetings' symposia, Professor Hirst said that these were well in keeping with past standards. A great deal of hard work had been necessary to ensure that all went smoothly. He then thanked Dr. R. N. Hazeldine, the society's representative in Cambridge, and his committee and Dr. J. R. Ruck Keene, general secretary of the society.

Professor R. G. W. Norrish proposed the toast of 'The Guests' at Trinity College and Professor Sir Alexander Todd was the proposer at Queens'. The Mayor of Cambridge replied for the guests at Trinity College and the Chancellor, Lord Tedder, at Queens'.

Plant Phenolics Group

Fellows of the Chemical Society attending the Anniversary Meetings were invited to a meeting to inaugurate an informal Plant Phenolics Group, held in the Botany School, University of Cambridge, on 9 April. This meeting was followed by a symposium on the 'Oxidation of plant phenolics'. The following gave papers: Professor R. D. Haworth, 'The oxidation of phenols', Dr. D. E. Hathway, 'The *in vitro* oxidation of plant phenolics', Dr. W. O. James, 'Polyphenolases as respirator enzymes', Dr. C. Weurman 'Enzymic browning of injured plant tissues'.

Shell Scheme to Attract More Science Teachers

FOUR public schools have received preliminary research grants from The Shell Petroleum Co. to enable research projects to be undertaken in their science departments.

The shortage of scientists in this country has been attributed to an insufficient number of the best young scientists being attracted to teaching as a profession, says Shell. It is thought that added attraction would be given to a teaching career if a research project could be undertaken as a part-time occupation within the circle of masters and boys specialising in science.

New Telephone No.

Wilfrid Smith Ltd., chemical manufacturers, 16 Philpot Lane, London EC3, announce that their telephone number is now MANsion House 2064/8.



Dr. R. H. Glauert, Aero Research Ltd., welcomes Fellows and Members of the Chemical Society. On Dr. Glauert's right is Mr. M. W. Perrin, treasurer of the Chemical Society, and on his left Mrs. Perrin, Professor Hayworth Mrs. Glauert, Professor Emeléus and Mrs. Hayworth. The occasion was a lunch given by Aero Research Ltd.

International Surface Activity Congress



Greeting one of 700 guests at their reception last week for delegates to the International Congress of Surface Activity are, l. to r., A. C. Halfpenny, F. Marzillier and Frank Schon, directors of Marchon Products Ltd.

THE INTERNATIONAL CONGRESS of Surface Activity was held in London from 8 to 12 April with Professor Sir Eric Rideal as president. About 1,000 scientists from 18 countries assembled to hear the 190 papers presented.

In an introduction in the conference handbook Lord Brabazon of Tara, president of honour, discusses the full implications of surface activity in all fields of life. 'Modern man,' he writes, 'is familiar with the surface action of soaps, shampoos, cleaning agents and washing compounds, but does he stop to think that the atmosphere around him—the

weather—is one great laboratory of surface-active changes. Does he stop to think that his body is a great laboratory where vital physical and chemical changes are constantly taking place at the cell surfaces?'

The congress has only held one previous meeting—in Paris in 1954 under the title *le Congrès de la Detergence*. The programme of the present congress has been greatly expanded in comparison and now includes such topics as fire-fighting, reductions of water loss from reservoirs, lubrication, and adhesion between solid surfaces.

ICI Explosives Factory To Be Put On Care And Maintenance Basis

OWING to a cessation of orders from the Government, chiefly on behalf of NATO, the ICI explosives factory at Powfoot, Dumfriesshire, leased by the company from the Ministry of Supply, is to be put on a care and maintenance basis. The staff of 470 will be reduced by about two-thirds by the end of the year.

Dr. R. V. Seddon, factory manager, and Mr. George Wilson, divisional labour manager, said at a mass meeting of the workers that when the present contract for explosives was completed, two shifts would be stopped, making a single day shift.

The first batch of workers was expected to become redundant about the end of May. The management said they hoped to be able to give a month's notice of dismissal. A small quantity of powder would continue to be manufactured at the factory for the Government, but a chemical, for use in the processing of paints, would be manufactured in future at the ICI factory, Dumfries.

Mr. A. I. Milton, secretary of the Solway Society, which is concerned with local development, said his society estimated that nearly £1 million had been spent in the last three years in rehabilitating a section of the factory which had never been used.

'It is a serious matter that this amount of public money should have been spent on a plant which apparently has no future,' he said. 'We imply no criticism of ICI in this matter of expenditure. We are going to demand an explanation through our local MP, Major Nial Mac-

pherson, Joint Under-Secretary of State for Scotland.'

Dr. Seddon said in a statement that the workers were told that if they wished to remain in the service of the company and were prepared to leave the district, attempts would be made to place them in other parts of the country. It was likely that members of the staff with appreciable service would be transferred to suitable vacancies in other units of the company.

The initial dismissals will effect process workers, and it is likely that they will be absorbed in the construction of the atomic station at Chapelcross, Annan.

Durham Raw Materials to Open New Laboratories

RESEARCH into the properties and applications of du Pont products for the rubber trade will be carried out at a new technical service laboratory to be opened by Durham Raw Materials Ltd. at Camberley, Surrey.

The new laboratory will supplement the work done by the company's technical centre at Birtley, County Durham.

In charge of the new laboratory will be Mr. Marshall Pike, A.I.R.I., who joined Durham Raw Materials after six years with the British Rubber Producers' Association and Rubber Developments Ltd.

Besides the du Pont rubbers, neoprene and Hypalon, Durham Raw Materials handle a range of zinc oxides and associated chemicals for the rubber industry.

Chemical Prices in March Were 6.1 Up On 1956

WHOLESALE price index of chemical and allied products in March, at 143.1, was 0.3 higher than the figure for February and 6.1 above March 1956. This is disclosed in the Board of Trade's wholesale price index for March, from which the following extracts are taken (30 June 1949 = 100):

Product	March 1956	Feb. 1957	March 1957
Dyes & dyestuffs	138.0	143.1	143.1
Disinfectants	123.7	126.5	126.5*
Insecticides, weedkillers & fungicides	135.7	135.5	134.5
Synthetic resins & plastics materials	123.1	124.1	122.9
General chemicals	154.5	162.2	162.4
Benzole, pure, BSS 136/1950	162.9	217.1	217.1
Caustic soda, liquor, 100° TW	151.9	157.6	157.6
Soda ash, light, d/d	159.6	164.5	164.5
Soda ash, light, f.o.r. works	167.3	173.4	173.4
Sulphuric acid, 80°	173.7	177.2	177.2
Sulphuric acid, 80°/94/95%	181.0	181.0	181.0
Soap, candles & glycerine	118.0	124.5	124.5*
Ethyl alcohol, industrial, BSS 507/1933	146.7	156.7	241.1
Carbon black	130.2	132.5	134.7
Fertilisers	198.1	203.6	203.8
Pyrites, c.i.f., UK ports	181.6	181.6	175.8
Sulphur, crude (for acid making), c.i.f.	179.2	188.3	188.3
* Provisional			

DCL Display at Epsom Careers Exhibition

STAND OF THE Distillers Company research and development department, Great Burgh, Epsom, attracted much attention at a Careers' Exhibition held recently at Epsom. Organised by local Rotary clubs, the exhibition was opened by Lord McCorquodale, chairman of the British Productivity Council.

The Distillers Company stand, which had a strong visual appeal, was divided into three sections. The first depicted some of the work of the analytical technician in chemistry and plastics; the second illustrated the production of penicillin and other antibiotics, while the third, which consisted of a working lathe, showed the opportunities awaiting the skilled engineering craftsmen.

Questions from schoolchildren and their parents were answered by Mr. L. M. Bryant, the company's administration manager, who also explained some of the diverse tasks that face the firm's laboratory assistants.

Management Invited to Nuclear Energy Conference

EXECUTIVES of leading chemical, oil and engineering companies are expected to attend a second information conference on nuclear energy for management, to be held in Amsterdam, from 26-29 June. The programme includes talks on basic and applied research, reactor technology, research centres, the role of industry in research; nuclear fuels, power reactors, moderators etc.; dangers of nuclear installations.

Full details can be obtained from the Industries and Manufacturers' Department, Division 2 (Room 1383), Board of Trade, Horse Guards Avenue, London SW1. Enrolment fee is 15,000 French francs, state the organisers, the European Productivity Agency of the OEEC.

PLANT FOR THE MANUFACTURE OF FLUOROACETAMIDE

By M. A. Phillips, D.Sc., F.R.I.C., A.M.I.Chem.E.

FLUOROACETAMIDE is now being prepared in substantial quantities for use in the manufacture of the one per cent solution known as Tritox, used as a systemic insecticide for the destruction of aphid pests of non-edible plants. Other formulations containing fluoroacetamide which have fumigant properties, are being investigated; all such formulations contain, in addition to the fluoro compound, acetamide which has been shown in experimental animals to have protective and antidotal action against the mammalian toxicity of fluoroacetamide (1).

Fluoroacetamide itself is a white crystalline solid of m.p. 110°C and is freely soluble in water. The fluorine atom is labile to caustic alkalis and the F-C linkage may be broken by enzymatic action in plants (2), which could account for its very low phytotoxicity; its insecticidal action is very marked and aphids on rose and chrysanthemum plants can be destroyed by contact action or systemic action ('translocation') at dilutions of the order of 1 in 50,000 or less. Fluoroacetamide is also used for the manufacture of sodium fluoroacetate by hydrolysis with caustic soda; if lime is used for the hydrolysis, calcium fluoroacetate is obtained. Sodium, calcium and barium fluoroacetates are powerful rodenticides and the sodium salt is the well-known compound No. 1080. Calcium fluoroacetate (AFL 1085) is non-hygroscopic and has this advantage over sodium fluoroacetate which it could replace as a

field rodenticide. Fluoroacetamide is now known as AFL 1081.

The manufacture of fluoroacetamide is based on the reaction between potassium fluoride and chloroacetamide by refluxing these together in a high boiling inert solvent, followed by entrainment distillation which removes the fluoride amide from the reaction mixture. On cooling the distillate, practically pure fluoroacetamide separates and after filtration this is dried at low temperatures and the filtrate is then returned to process; after many reuses, the solvent may be recovered by distillation in the usual manner.

For the manufacture of sodium fluoroacetate, the amide is refluxed for a short time with rather more than one equivalent of dilute sodium hydroxide and the filtered solution is then dried on a roller or drum drier since it is sufficiently thermo-labile to make other methods, except spray drying, impracticable. Calcium fluoroacetate is also dried by the same method for the same reason.

The plant for manufacture of fluoroacetamide is shown in Fig. 1 and consists essentially of a stainless steel still (1) into which the pre-heated inert solvent is fed from a feed tank (2) at the same rate as distillation is occurring; the still (1) contains the reaction mixture of potassium fluoride and chloroacetamide. The solvent selected is a chlorinated hydrocarbon and its non-inflammability enables the use to be made of gas heating throughout. The vapours from the still (1) are partly condensed in wide, glass

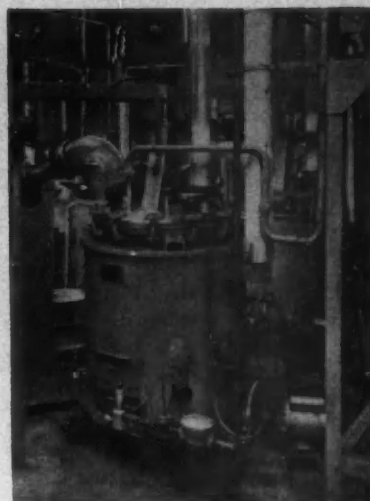


Fig. 2. Automatic gas heater comprising a thermostat, a Thermoperl flame failure device and a clock control. In the event of a failure of the pilot flame the controls automatically set to the safe position

air condensers and are then cooled in the receiver (3) by means of internal cooling coils and a water jacket and the solids are then filtered on the covered Minifilter (4). Mother liquors are taken to the QVF glass receiver (5), from which they are pumped back to the feed tank (2). Final mother liquors may be run from the receiver (5) to storage vessels for solvent recovery.

In addition to the above plant, chloroacetamide itself is manufactured by reacting ethyl chloroacetate with concentrated aqueous ammonia at low tempera-

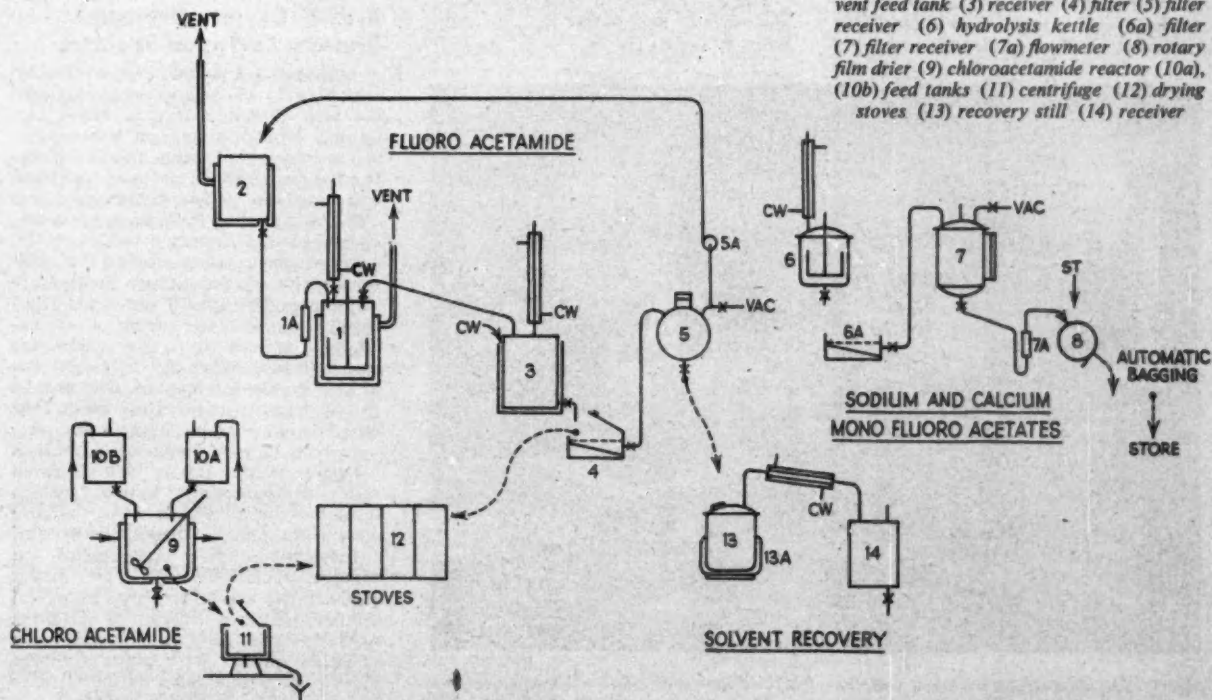


Fig. 1. (1) Reactor (1a) flowmeter (2) solvent feed tank (3) receiver (4) filter (5) filter receiver (6) hydrolysis kettle (6a) filter (7) filter receiver (7a) flowmeter (8) rotary film drier (9) chloroacetamide reactor (10a), (10b) feed tanks (11) centrifuge (12) drying stoves (13) recovery still (14) receiver

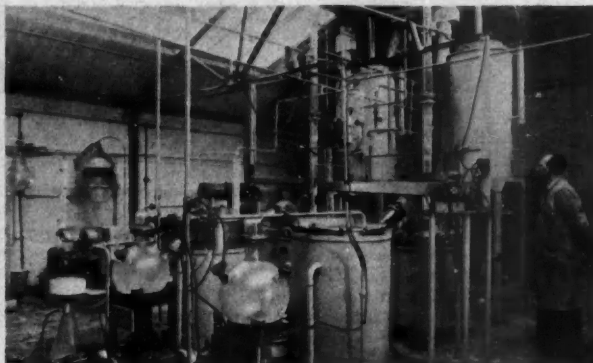
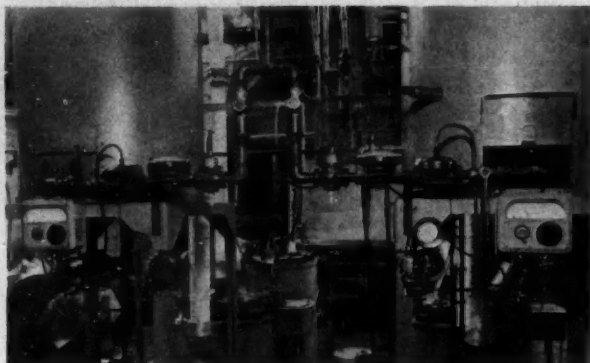


Fig. 3 (left) shows an Aric thermostat which can be pre-set for cut-off at any desired temperature within its range. Fig. 4 (right) is a general view of the fluoroacetamide plant

tures, the amide being centrifuged, washed with ice-cold water and dried in a low temperature stove.

Sodium fluoroacetate may be made from the amide by hydrolysis in the stainless steel vessel (6); after filtration using decolorising agents, the filtrate is stored and dried on the film (roller) drier (7).

It was decided that the above fluoroacetamide plant should be gas heated in preference to being heated by steam or electricity and the use of chlorinated hydrocarbon solvents, which gave better results than those obtained with inflammable solvents, made this feasible. Further, in order to automatise the plant as much as possible, it was decided to make use of special automatic gas-heating apparatus designed by the North Thames Gas Board Watson House Industrial Engineers and such plant was constructed to the special requirements of this project.

The still (1) consists of a 100 l. stainless steel vessel, fitted with agitator and alternative water reflux and air distillation condensers with interlocked controls; an oil jacket is fitted with vent and com-

bined oil filter and overflow. This is heated by an automatic gas heater comprising a constant pressure governor, a rod type thermostat in the oil operating on a remote relay valve, a Thermoperl flame failure device and a clock control; this enables the heating to come into operation and to shut off completely at any predetermined time and to shut down on its thermostat at the desired temperature.

In the event of a failure of the pilot flame, the controls automatically set to the safe position. Fig. 2 shows this heating mechanism. The same controls, with the exception of the rod type thermostat, are fitted for preheating the solvent in the feed tank (2) which is a 60 gallon steel vessel, lagged; in this case an Aric instrument is fitted—this is a thermostat incorporating a dial thermometer which can be pre-set for cut-off at any desired temperature within its range. This device is sensitive to within 1°C on either side of its setting, and is shown in Fig. 3.

The gas burners in both units consist of a series of Bray burner jets; the former burns 80 cu. ft. per hour at 1.6 in. water

gauge working pressure and the latter 120 cu. ft. per hour.

With this device, it is possible to attain a working temperature of over 100°C in about 1½ hours from start up and to maintain distillation and feed at a rate of 12 gallons per hour; the feed rate is measured and controlled by the use of Rotameters.

Fig. 4 shows a general view of the fluoroacetamide plant which is duplicated.

Fig. 5 shows the chloroacetamide plant (extreme right) and the experimental Mitchell twin-drum six in. film drier with the larger production film drier designed by City Chemical Plant Co.; the boiler is shown on the extreme left.

The author wishes to thank the officers of the North Thames Gas Board for their co-operation and for the technical details of the automatic gas-heating devices designed by them and to the directors of Associated Fumigators Ltd., to which his firm acted as consultants in the project, for permission to publish this paper.

REFERENCES

- (1) Phillips & Worden, *Lancet*, 6 October 1956.
- (2) Hughes & Saunders, *Chem. & Ind.*, 9 October 1956, p. 1265.

British Oxygen Overcome Brewery Corrosion Problem

A CORROSION PROBLEM facing a Cheltenham brewery was recently overcome with the help of British Oxygen Gases Ltd. Caustic vapour rising from bottle washing machines was causing moisture to rise to the roof girders, forming rust and corroding the steelwork. Moisture was also causing pitting in the concrete ceiling and fungus was beginning to form.

British Oxygen first cleaned the steelwork with oxy-acetylene flame-cleaning torches. While still warm the steelwork was given two coats of a rust-inhibiting primer on a red oxide zinc chromate base. When dry, a further coat of this primer was applied, followed by two undercoats and a gloss finish. The last three were on an Epikote base and were both fungicidal and alkali-resisting.

Fungus in the ceiling was destroyed with flame-cleaning torches, which separated surface plaster from the concrete in the process. Two applications of a fungicidal solution were applied, the concrete replastered, the new plaster receiving two applications of a fungicidal solution which penetrated to ensure a sterile basis for painting. Two coats of a fungicidal primer were given, followed by two undercoats and a finish. All were Epikote-based.

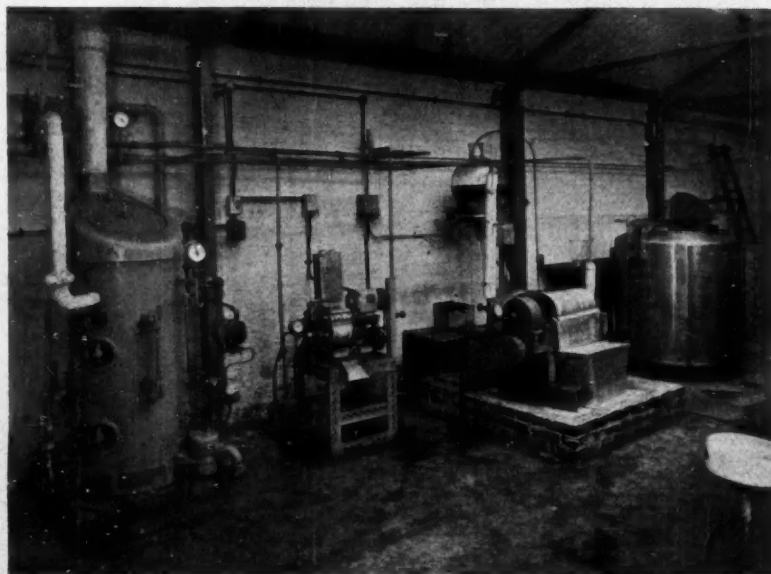


Fig. 5. The chloroacetamide plant (extreme right) and the experimental Mitchell twin-drum film drier designed by City Chemical Plant Co. The boiler is shown on the extreme left

Overseas News

CAPACITY OF ACRILAN PLANT TO BE EXPANDED BY 50 PER CENT

ACRILAN acrylic fibre plant of Chemstrand Corporation, Decatur, Alabama, US, now operating at its full production rate of 30 million lb. a year, will be enlarged to 45 million lb. The new facilities are scheduled for completion in the first quarter of 1958.

The new expansion move is a result of the company's planned overall growth programme. Initial production of Acrilan set at 5 million lb. of fibre a year beginning early in 1959 and rising to 10 million shortly after, is planned by Chemstrand Ltd., at Coleraine, Northern Ireland.

Expansion is also under way at the US company's nylon plant at Pensacola, Florida, which is scheduled to reach 114 million lb. annual capacity during next year. This represents almost a 100 per cent increase on present capacity.

Boron Halides Manufactured in US

Boron trichloride and boron tribromide are now in commercial production by American Potash and Chemical Inc., US. Boron trichloride is also being made by Stauffer Chemical Co. It is the first time, however, that full commercial production of boron tribromide has been announced. Previously only sample quantities of this compound had been offered by US Borax and Chemical. (See also page 684.)

New Process Cuts Zirconium Extraction Costs

A process for the extraction of zirconium from mineral bearing beach sands, developed by the Australian Commonwealth Scientific and Industrial Research Organisation, is enabling many US producers of zirconium to cut their prices. The process was sold to the National Distillers Corporation of America, which have a pilot plant for the process at their Cincinnati laboratories. An official of the Corporation says the process has considerably reduced the cost of separating hafnium from zirconium by eliminating the cumbersome extraction steps inherent in current and projected production.

Venezuelan Petrochemical Institute Developments

News of the development of the Venezuelan Petrochemical Institute was given by the Venezuelan Minister of Mines recently. The first phase, costing Bs. 225 million, is now 60 per cent complete. Initial production is at an annual rate of 10,000 metric tons of chlorine,

11,200 tons of caustic soda, and an increasing quantity of fertiliser, some of which is understood to be already on sale. It is hoped that annual production will eventually be of the order of 150,000 tons.

The second phase is due to begin late this year. This will cost Bs. 250 million and consist of the production of explosives, herbicides, fungicides and natural gasoline. Development of the national gas pipeline network for which the Institute is now responsible is included in this second phase as is the purchase of the Venezuelan Atlantic Refining Corporation's system.

Scheduled for 1958-60 is the third phase which will cost Bs. 500 million. It will include the production of synthetic rubber, plastics, lacquer and refined oils. Eventually the Institute plans to have its own oil refinery. When completed in 1960, the total investment will have reached Bs. 1,000 million.

Iraq's Sulphur Recovery from Natural Gas

In a special register circular (TEN/24954) issued on 28 March, the Export Services Branch of the Board of Trade, Lacon House, Theobalds Road, London WC1, gave information concerning requirements by the Development Board and Ministry of Development of the Government of Iraq, for the project for sulphur recovery from natural gas.

Tender documents (including specifications and drawings) have now been received at the Branch. From 15 April these were available for loan to UK companies in order of receipt of application. Reference number ESB/7768/57 should be quoted in any correspondence.

Dow Chemical Buy Mexican Company Shares

Dow Chemical Co. of the US have acquired 50 per cent of the shares of the Mexican company Sales y Alcalis SA which holds concessions for the exploitation of rock salt. The company will erect a plant near Coatzacoalcas, Vera Cruz, for the production of caustic soda, chlorine and derivatives.

German Phthalic Acid Plant

Now in operation at Bochum is a new phthalic acid plant owned by Gelsenkirchener Bergwerks AG and Badische Anilin-und Soda fabrik (BASF). It has been erected on the site of Chemische Werke Carolinenglück Bochum in order to take advantage of the naphthalene pro-

duced as a by product by the latter company in its coking and coal-tar distillation. Chemische Werke Carolinenglück is a subsidiary of Gelsenkirchener Bergwerks AG.

At present the plant is operating at about two thirds capacity but it is designed to produce 1,000 tons a year. A number of concerns are manufacturing phthalic acid in Western Germany, but are unable to satisfy all German requirements. Phthalic acid output last year was estimated at about 29-30,000 tons.

UK Agencies Sought

Houghton and Byrne Pty. Ltd., 225 George Street, Sydney, NSW, wish to obtain additional agencies for UK manufacturers of agricultural and industrial pest control and fumigation chemicals and allied lines. Mr. J. McMullen, B.Sc., a technical executive, will be in London from about mid-June. The company act as agents for three UK producers of fumigators and of some special poisons.

US Seeks Plutonium Development

Speaking to the 131st national meeting of the American Chemical Society, US Atomic Energy Commissioner, Mr. Willard F. Libby, asked American chemists to develop a means of burning as power-producing fuel, the very large quantities of plutonium generated as a by-product in uranium fuelled reactors.

The UK nuclear power programme has, of course, always considered the use of plutonium as an atomic power fuel. Sir John Cockcroft recently stated on his visits to Bagdad and Rome that by 1965, the UK was likely to be recycling plutonium in the form of ceramic fuel, plutonium oxide and mixed with uranium oxide.

Fatty Acid Plant for East Flanders

Fatty acids and by-products are to be made in Belgium by the Archer-Daniels Midland Co., Minneapolis, US, in conjunction with Palmatina (subsidiary of Petrofina). A new company, Oléochin, SA, has been formed for this purpose and a plant is to be built at Ertvelde, East Flanders, at an estimated cost of Belgian Frs. 100 million. Production is scheduled to begin at the end of next year.

CIL to Build Sulphuric Acid and Oleum Plant

Construction of a new contact sulphuric acid and oleum plant with a daily production capacity of about 150 tons will soon be undertaken by Canadian Industries Ltd. at Beloeil, Quebec. Both products will be used at CIL's Beloeil works in the manufacture of agricultural chemicals and explosives. Output will also be available to supply the increasing requirements of consumers in the Montreal area.

Construction of another sulphuric acid producing unit at Copper Cliff, Ont., was

recently announced by CIL to double, at least, the output from their present plant at that location. This new plant will supply acid to the uranium mining companies in the Bling River area where it is used for extraction of uranium from ore.

New Use for Fluorocarbon

Du Pont fluorocarbon, Freon 114, the aerosol propellant, can be used in new cold vapour heating systems. In conventional heating systems this compound takes the place of water. The propellant is vaporised with hot water or light mineral oil by means of a heat exchanger before it enters room radiators. When the system is shut off, Freon flows back as a liquid. It is considered that it will have a wide application in heating systems which are not in continuous use.

Liege International Fair

One of the specialised exhibitions at the 1957 Liege International Fair, to be held from 27 April to 12 May, will cover scientific research and industry. During a special congress, papers will be presented on these subjects from lecturers from Britain, France, Belgium, Holland, Scandinavia, Switzerland and the US.

French Embargo on Boron Chemical Exports

An embargo on the export of boron-containing chemicals has recently been announced by the French Government. Special export licences will now be required for the following: natural borates; boron, boric acid and anhydrides; various fluorides; boron trichloride; soda; potash, ammonia, calcium and magnesium borates; and boron-containing compounds.

Atoms Reactors on UK Pattern for Germany

Minister for Atomics Herr Balke, recently stated on his return from a trip embracing the UK, Canada and the US, that Germany will emulate Britain in building atomic reactors employing natural uranium. He reported that he had discussed in Canada a contract for 500 tons of natural uranium, which if concluded, would supply German needs for a considerable number of years. Herr Balke added that the US was ready in principle to supply Germany with 1,500 kilograms of enriched uranium. This deal would be made separately for each project, he said, as the need arose.

Sulphur Resources of Five US States

Five Rocky Mountain States—Wyoming, Colorado, Utah, New Mexico and Arizona—are potentially important contributors to the US's sulphur supply, even though their present production is relatively small, according to a Bureau of Mines report (K7770).

At present, most of the US supply comes from deposits of native sulphur mined by the economical Frasch process. This involves injecting superheated water into a deposit to melt the sulphur, forcing the molten sulphur to the surface, and then cooling, and storing it.

Wyoming, Colorado, Utah, New Mexico, and Arizona have no known sulphur deposits minable by the Frasch process, but they contain large quantities of pyrites, sulphide ores of base metals, and high-sulphur petroleum and natural gas, all of which are currently or potentially important sources of sulphur.

In addition, each of these States has small deposits of sulphur ore at or near the surface and minable by open-pit methods.

The report shows that Wyoming has a large reserve of hydrogen sulphide, much of it recoverable. Pyrites and pyritic ores of base and precious metals are widely distributed in the Colorado mountains.

Sulphide ores, and pyrites impounded in tailings ponds are Utah's largest known sulphur reserves. Oil and gas fields in SW and NE New Mexico and base metal ores, particularly near Silver City, Grant County, contain large reserves of sulphur.

Sulphide ores of copper, lead, and zinc, and the pyrites associated with them, constitute a large sulphur reserve in Arizona.

Citric Acid Now On Argentine Free Exchange Rate

Citric acid and filtering earths can now be imported in the Argentine at the free rate of exchange, without surcharge and without prior permit. Other products which may now be imported at the free rate, without surcharge and without permit are: Glycolic ethers and esters, ethylene glycol, diethylene glycol, polyglycol and their ethers and esters; mono, di and triethanolamine; glycolic ethers and esters, ethylene glycol, diethylene glycol, polyglycols and their ethers and esters; ethyl and methyl cellulose only; and sodium tannate.

In addition provision is made for automatic exchange permits for the import from any source of para-nitro-bromoacetophenone.

Phosphate Rock Concentrating Plant Proposed for Israel

Establishment of a £12 million phosphate rock concentrating plant has been suggested by the Technological Advisory Board to the Israeli Ministry of Development. It will consist of a full-size furnace with a capacity of 60,000 tons and is to be situated near the phosphate rock quarries at Oron.

US By-product Sulphuric Acid

US output of by-product sulphuric acid at copper and zinc plants in 1956 was 1,192,100 short tons (basis 100 per cent), an increase of 7 per cent over 1955. The fifth sulphuric acid unit at the plant of Garfield Chemical and Manufacturing Corporation, Garfield, Utah, began producing towards the end of 1956.

Spain Still Has a Need for Substantial Imports

Despite a considerable increase in Spanish output of chemicals and allied products in recent years, a steady rise in consumption maintains a call for substantial imports. There is also a large range of chemicals which cannot yet be produced in Spain. Principal foreign suppliers of heavy chemicals are Germany, France, the UK, Switzerland and Sweden. Development of the Spanish fine chemical industry since 1950 has been less rapid.

This is reported in an Economic Survey of Spain, published by HM Stationery Office, Kingsway, London WC2, price 8s (by post 8s 6d).

MCA Facts Book 1957 Now Available

Third edition of *The Chemical Industry Facts Book* has been published by the Manufacturing Chemists' Association, 1625 Eye Street, Northwest, Washington 6, DC. In 160 pages are 15 chapters on subjects ranging from 'The Industry's Role in the Economy' to such specific topics as 'Chemicals and Nuclear Energy.'

About 100,000 copies of the facts book will be distributed either by chemical companies or by the MCA. Cost for single copies is \$1.25, postage prepaid. The MCA claims to represent more than 90 per cent of the productive capacity of the US chemical industry.

West German Chemical Production Increases

West German chemical production increased to 218 in February (taking 1938 as 100) against 180 for February last year and about 208 in January this year. The figure for inorganic chemicals rose four points to 206. This was not enough to supply the rising domestic demand and many producers continued expansion of production installations.

Sulphuric acid output amounted to 162,900 in February, against 184,800 tons in January and a monthly average of 172,100 tons last year. Soda production was 77,700 tons in February compared with 86,500 tons in January and 70,100 tons in February last year.

Production index for organic chemicals rose to 281 in February compared with 224 in the same month last year.

Petrochemical Expansion at Wesserling

Capacity of the petrochemical plant at Wesserling, owned jointly by the German Shell organisation and Badische Anilin und Soda Fabrik, is to be increased 300 per cent within the next 18 months to an annual output of 30,000 tons of olefine products and to 36,000 tons of ethylene and benzole combined. Cost of the project is £12 million, to be borne equally by both companies.

RESULTS OF NBS WORK SHOULD HELP WITH MULTI-FACTOR PROBLEMS

RESULTS obtained by the statistical engineering laboratory of the US National Bureau of Standards in conjunction with the Chemical Corp, Department of the Army, should save both time and effort for experimenters faced with multi-factor problems.

Both the experimental scientists and the research worker in industry are faced from time to time with the problem of evaluating the joint effects of several factors on a material or process. To test all possible alternatives would frequently be a much too lengthy process.

The results, published as *Fractional Factorial Experiment Designs for Factors at Two Levels*, list experiment designs in which the number of factors ranges from seven to 16, with all factors allowed two different conditions. For problems with these general characteristics the experimenter can choose from procedures requiring only $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{64}$, $\frac{1}{128}$, or $\frac{1}{256}$ of all possible experimental combinations.

An example is given of an industrial chemical process which depends on the

commercial grade of the principal reactant, its source, the amount and concentration of acid used, and the pressure, temperature and time of reaction. It is proposed to study the effects on the characteristics of the final product when these seven factors are varied and it is assumed that it is sufficient to consider only two alternatives in connection with each factor. There are 2^7 or 128 possible experimental combinations.

It is claimed that a study of this publication will enable the best results to be obtained by carrying out only a fraction of the total number of investigations.

There is bound to be a loss of precision resulting from this procedure but, it is claimed, this is often more than compensated for by the saving in time and expense.

Fractional Factorial Experiment Designs for Factors at Two Levels will be available from Superintendent of Documents, US Government Printing Office, Washington 25, DC.

Leading Artificial Fibre Producers Combine

COURTAULDS and British Celanese, Britain's two major artificial fibre producers, are to merge. Taking into account overseas interests the new group will be the largest producer in the world of man-made fibres.

Courtaulds is to make a share-exchange offer for the whole of the issued stock of British Celanese. The merger decision follows discussions which convinced the directors of both companies 'that a close association would be of advantage to both and would be in the national interest'.

Last autumn British Celanese reported a sharp fall in profits for the half year ended 30 September 1956. There has been an improvement in the second half of the year to 30 March 1957 but the group profits for the full year are expected to be about two-thirds of the figure for the preceding year which was £2,446,550.

This merger appears to have caused some surprise in the textile industry. The two companies have always differed widely in production methods and organisation. During recent years, however, there has been closer collaboration, shown, for example, by the formation of the British Man-made Fibres' Association.

Waiting Period for Patents' Applications

On 12 April the Board of Trade laid before Parliament rules under the Patents Act, 1957, laying down the period within which an application for a patent must be put in order for acceptance. As was expected from the debates on the Act, the period is three and a half years from date of filing the complete specification.

Chemical Recovery Boiler for Kraft Process

BABCOCK AND WILCOX Co. in the US have recently begun construction in Hodge, La., of what is claimed to be the highest pressure, highest temperature chemical recovery boiler ever built for the Kraft pulping process.

It is a 300 ton recovery boiler for the Continental Can Company's Robert Gair division. Designed to operate at 1,250 lb. pressure at the superheater outlet, with a final steam temperature of 900°F, the unit will be capable of processing liquor resulting from the production of 300 tons per day of Kraft pulp.

Construction of this recovery boiler is described as a most important advance in steam and power generation for the pulp and paper industry. Power requirements in the industry are increasing rapidly.

British Standards for Thermometers

FOUR new British Standards for thermometers of different types have recently been published.

The first, BS 2840:1957 (general purpose maximum and minimum thermometer (Six's pattern)) specifies the materials, dimensions and construction for Celsius and Fahrenheit thermometers and for scale plates and frames for use in greenhouses etc.

BS 2841:1957 (general purpose wet and dry bulb hygrometer) describes the materials, dimensions and construction for an unventilated hygrometer such as is used in mines, textile mills etc.

Thermometers for use in a whirling hygrometer for the determination of air temperature and humidity in ships, mines, factories etc., are specified in BS 2842:1957. Information is given in an appendix on the accuracy with which relative humidity may be determined by means of this instrument.

BS 2843:1957 (spirit-in-glass metal-sheathed thermometer) gives details for design and construction for a robust sheathed Fahrenheit thermometer for use in water baths etc.

Copies of these standards are available from British Standards Institution, Sales Branch, 2 Park Street, London W1.

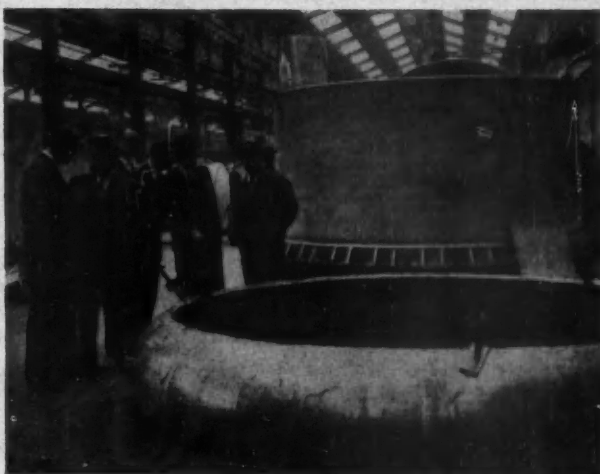
Research Accelerator to be Built at Harwell

The first accelerator to be built for the National Institute for Research in Nuclear Science will be on a site adjacent to the research establishment at Harwell, subject to planning consent. Reasons for this choice are immediate availability of land suitable for this heavy machine and the adequate arrangements which already exist for essential services.

Precise specifications for the accelerator have not yet been determined, and until this is done no final decision to proceed with design and construction will be taken.

Rumanian Minister at APV Plant

The Rumanian Minister in London, at the Crawley factory of the APV Co. last month. He is seen here inspecting part of a dished end for a series of large vessels for the manufacture of hydrogen peroxide. The vessels are being made for Laporte Chemicals Ltd. Mr. Corcinschi, Rumanian Minister in London, is on the right; second from right is Dr. R. Seligman, chairman, APV





Ampholytic Surface Active Agents

An ampholytic surface active agent, Armeen Z, is described in technical bulletin No. L-19 published by Armour and Co., Chemical Division, Lindsey Street, London EC1. Generally, says the bulletin, the best detergents are anionic and the best germicides cationic. The two classes cannot be mixed without impairing their respective surface active properties. Ampholytic compounds may, however, exhibit properties of both classes. Such a compound is Armeen Z which is the reaction product of coco amine (derived from coco fatty acids) and crotonic acid. Armeen Z is supplied as a 50 per cent aqueous gel. It is soluble in water and in polar solvents, and is dispersible in carbon tetrachloride, chloroform, benzene and xylene. It has uses as a germicide, pigment softener, detergent, and in the cosmetic field.

Another technical bulletin, No. L-20, has also been published by Armour. It describes the use of Armac C as a softening and flushing agent for pigments.

New Price Lists

Two new price lists are available from Doran Instrument Co. Ltd., makers of pH and other precision instruments, Stroud, Glos. Another new leaflet describes the Mini thermo-couple potentiometer.

Acheson Colloids Issue Dispersions List

A new four-page folder, uniform in size and format with the previously issued 'List of "dag" Dispersions', has been published by Acheson Colloids Ltd., 18 Pall Mall, London SW1. This companion piece of literature lists alphabetically various applications for 'dag' products and refers briefly to their advantages in each case. The information is given under three main headings: 'dag' dispersions as production lubricants, their use in manufactured products and as maintenance and operational lubricants.

New Titanium Oxide Pigment

Anatase LF, a new anatase pigment for the surface coating and allied industries, is described in a booklet (BTP No. 46) published by British Titan Products Co. Ltd., Coppergate, York. The new pigment is a fine particle, modified titanium oxide pigment with the anatase crystal structure. It has been added to the BTP range of titanium pigments to meet the demand for a pigment of supreme whiteness with good dispersion

characteristics, in applications where existing anatase or rutile grades are not entirely satisfactory. It is claimed to have a high brightness and a remarkably clean neutral tone.

Hardener M57

The production of plywood and Duralum by F. Hills and Sons Ltd, and the application of hardener M57, a phenol-formaldehyde synthetic resin glue are described in Bulletin 169 published by the technical service department of Aero Research Ltd., Duxford, Cambridge.

Wild-Barfield Journal

Latest issue of the *Wild-Barfield Heat-Treatment Journal* contains an article on the use and abuse of the Spekker photoelectric absorptiometer. One of the chief causes of SPA failure, says the article, is stray light. Should all precautions fail to bring about any improvement it is quite likely that a white overall worn by the operator is the cause of the trouble.

Iodine References

The Chilean Iodine Educational Bureau has recently published Vol. 4, No. 3 of *Current Iodine Literature*, which is a list of references to articles and reviews on iodine which have appeared in the last few months. Divided into 10 sections, the book contains 199 references.

Careers in Plastics

A broadsheet on 'Careers in Plastics,' which has recently been distributed to schools in England, Scotland and Wales, is available from the Plastics Institute, 6 Mandeville Place, London W1.

Biological Stains Handbook

Biological Staining Methods by George T. Gurr the sixth edition of which is now available, has been revised since the previous edition and a number of additional methods have been included. The number of formulae has been increased. Copies may be obtained, price 5s (by post 5s 6d) from George T. Gurr Ltd., 136-138 New King's Road, London SW6.

Electronic Air Filters

Trion electronic air filters are described in a brochure from Electronic Division, Harris Engineering Co., York House, Browning Street, London SE17. It is claimed by the makers that this type of air filtration will eventually supersede most other types of air filters since it collects dust below 10 micron to 0.01 micron. The principle of the system is

that the suspended particles are given a positive charge as they pass through a high voltage ionising screen. These particles are then attracted and adhere to the collecting plates which form the negative elements of an electrostatic set up between a series of parallel plates. The collecting plates are cleaned periodically by washing with water.

Use of Rayleigh Interferometer Described

Contained in the February issue of the *Hilger Journal*, published by Hilger and Watts, 98 St. Pancras Way, London NW1, is an article on the use of the Rayleigh interferometer with volatile liquids by Dr. J. J. Kipling of Hull University. Dr. Kipling uses a Rayleigh refractometer to determine the relative amounts of liquids in a mixture and has a special cell, made by Hilger and Watts, to hold volatile samples. The instrument has been used for investigating adsorption by charcoal from mixtures of benzene and cyclohexane. The new cell has proved to be satisfactory even with the highly volatile tertiary butyl chloride.

BDH Now Supply Linde Molecular Filters

Linde molecular sieves types 4A and 5A for laboratory use are now available from the BDH Laboratory Chemicals Group, Poole, Dorset. A booklet published by the company describes these filters and indicates their possible laboratory and industrial uses. Linde molecular sieves are highly porous, dehydrated, crystalline zeolites in which the pores are of molecular dimensions and which therefore adsorb only those molecules which are small enough to enter the pore system. A possible suggested use is the separation of hydrocarbons where distillation is not feasible and other adsorbents are unsuitable or less efficient. Recoveries of 99.9 per cent purity have been obtained from a mixture of 95 per cent benzene and 5 per cent n-tetradecane after one pass.

Fire Risks of Electricity

'Electricity and the Fire Risk in Industrial and Commercial Premises' published by the Fire Protection Association, has been prepared with the guidance and assistance of an expert panel representing the electrical industry and fire protection. It deals with the general aspects of the problem and with some of the causes of electrical breakdown which may result in fire. It is intended for the benefit of those responsible for industrial and commercial concerns, so that they may satisfy themselves that their equipment is safe and is being properly maintained. It includes a bibliography of more detailed regulations and recommendations. Copies may be obtained free from the FPA at 15 Queen Street, London,

Clean Air Society

At a special meeting of the National Smoke Abatement Society on 11 April it was unanimously agreed that the society should seek incorporation as a company limited by guarantee and without share capital, and with the new name 'National Society for Clean Air.'

**NEW
VIKING
AGITATOR**

THE Viking agitator, manufactured by Viking Engineering Co., Hodge Lane, Salford 5, is designed to provide efficient agitation of liquids up to a viscosity of 300 centipoise.

Agitators of this range are intended for use in applications which are too heavy for clamp and portable types. They are available in powers ranging from one to $7\frac{1}{2}$ h.p. at speeds of 720, 960 and 1,450 r.p.m. Where process conditions demand slower speed agitation a coaxial gear-reducing unit is inserted between the motor and the coupling housing.

In most cases a large diameter, short pitch marine type propeller is fitted. Turbines of several types and dispensers with stationary shrouds are available and are recommended where process conditions show that they are more suitable.

The Viking agitator is mounted on a British Standard flange on the side or head of the vessel. The unit is sealed in all positions against leakage of process fluids along the shaft of the machine.

Main functions of the Viking agitator are the mixing of miscible liquids, the dispersion of immiscible liquids, the dispersion and suspension of solids in liquids, the improvement of heat transfer between coils or jackets and liquids.

**AIR
INJECTION
SCAVENGING**

TO AVOID contamination of their high vacuum pumps by condensed vapours, Pulsometer Engineering Co. Ltd., Nine Elms Works, Reading, are fitting them with air injection scavenging.

Scavenging air enters the cylinder after the rotor blade has isolated the suction port. The air is then able to support a considerable amount of the water vapour without condensation occurring, particularly when the mixture is raised in temperature as a result of the pump's discharge action. A discharge temperature of 195°F, for example, would mean that each cubic foot of injected air carries 0.0265 lb. of water with it.

It is usual to limit the amount of injected air to a maximum of 10 per cent of the nominal swept volume of the pump. A 100 c.f.m. pump can therefore handle 0.0265 lb. of water per minute. The required discharge temperature is attained on the larger pumps by restricting the flow of cooling water but some models may need heating and the provision of slight back pressure.

When working against full air injection at maximum temperature, the pumps will, it is claimed, still maintain a high degree of vacuum from 0.1 mm to 0.3 mm depending on the particular model.

EQUIPMENT REVIEW

Chemical Plant : Laboratory Apparatus Safety and Anti-Corrosion Products

With reduced amounts of injection and more normal temperatures, high degrees of vacuum are achieved down to the normal ultimates of the pumps involved.

**HARD
METAL
SEALS**

STANDARD seals are now being supplied with hard metal opposing faces of the insert type by Crane Packing Ltd., a Tube Investments company, of Slough, Bucks. They are designed to handle abrasive services such as calcium sulphate slurry, suspension of powdered pumice, rouge, sandy water, with which carbon faces would have a short life.

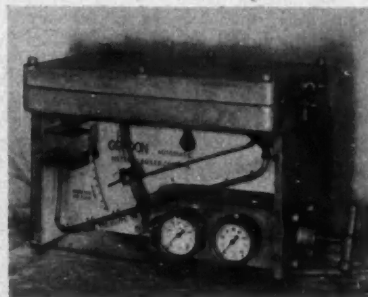
They are also said to be suitable for mildly corrosive conditions such as sea water, inorganic salt solutions and all types of boiler feed waters; all organic solvents, esters, ketones etc.; weak alkalis, e.g. sodium carbonate; but not suitable for concentrated acids. The special metal used is Coromant, which is the trade name for hard metals produced by Sandvik Steel Works Co. Ltd., Sweden.

Supplied only in matched pairs, these hard metal faces are at present available for type 1 and type 2 Crane standard seals and are interchangeable with the usual metal/carbon face combinations.

**OIL
CONTROL
SYSTEM**

A SIMPLE automatic metering control system, which may be more attractive than a conventional system, has been developed by James Gordon and Co. Ltd., Dalston Gardens, Stanmore, Middlesex. It has been designed for use where either simplicity combined with accuracy of the control gear, or low cost of installation, or both are of deciding influence in the choice of a system, as for instance, for control of medium or small oil-fired boilers.

When applied to a steam boiler, this system maintains steam pressure within



Gordon control system

narrow limits, by regulating the combustion air in relation to small variations in the pressure caused by changes in the demand for steam. It also regulates the oil supply to the burners in the required relation to the air quantity, despite change in the number of burners in use or changes in load.

Advantage of the SD control system is said to be its low initial cost. Savings in fuel which will result from its installation will pay for the apparatus in a short time.

**PORTABLE
DEMINROLIT
PLANT**

DISTILLED quality water without the use of heat or power is obtained from the new Permutit Mark V portable Deminrolit plant, produced by the Permutit Co. Ltd., Permutit House, Gunnersbury Avenue, London W4.

Basically, the Mark V consists of two columns of ion exchange material. 'Raw' water passes through the first column



Permutit Deminrolit plant

containing Permutit Zeo-Karb cation exchange material; mineral salts contained in the water are converted to their corresponding acids. These acids then pass down through the second column which contains Permutit De-Acide ion exchange material which absorbs acids. The demineralised, or de-ionised, water which results from this process is stated to be of distilled quality. Six gallons of such water can be supplied hourly. A dial type conductivity tester is also incorporated in the plant.

It is claimed that the Mark V portable is easy to operate and thoroughly reliable, the only running costs involved being the small quantities of acid and alkali required for regenerating the ion-



Ampholytic Surface Active Agents

An ampholytic surface active agent, Armeen Z, is described in technical bulletin No. L-19 published by Armour and Co., Chemical Division, Lindsey Street, London EC1. Generally, says the bulletin, the best detergents are anionic and the best germicides cationic. The two classes cannot be mixed without impairing their respective surface active properties. Ampholytic compounds may, however, exhibit properties of both classes. Such a compound is Armeen Z which is the reaction product of coco amine (derived from coco fatty acids) and crotonic acid. Armeen Z is supplied as a 50 per cent aqueous gel. It is soluble in water and in polar solvents, and is dispersible in carbon tetrachloride, chloroform, benzene and xylene. It has uses as a germicide, pigment softener, detergent, and in the cosmetic field.

Another technical bulletin, No. L-20, has also been published by Armour. It describes the use of Armac C as a softening and flushing agent for pigments.

New Price Lists

Two new price lists are available from Doran Instrument Co. Ltd., makers of pH and other precision instruments, Stroud, Glos. Another new leaflet describes the Mini thermo-couple potentiometer.

Acheson Colloids Issue Dispersions List

A new four-page folder, uniform in size and format with the previously issued 'List of "dag" Dispersions', has been published by Acheson Colloids Ltd., 18 Pall Mall, London SW1. This companion piece of literature lists alphabetically various applications for 'dag' products and refers briefly to their advantages in each case. The information is given under three main headings: 'dag' dispersions as production lubricants, their use in manufactured products and as maintenance and operational lubricants.

New Titanium Oxide Pigment

Anatase LF, a new anatase pigment for the surface coating and allied industries, is described in a booklet (BTP No. 46) published by British Titan Products Co. Ltd., Coppergate, York. The new pigment is a fine particle, modified titanium oxide pigment with the anatase crystal structure. It has been added to the BTP range of titanium pigments to meet the demand for a pigment of supreme whiteness with good dispersion

characteristics, in applications where existing anatase or rutile grades are not entirely satisfactory. It is claimed to have a high brightness and a remarkably clean neutral tone.

Hardener M57

The production of plywood and Dural by F. Hills and Sons Ltd. and the application of hardener M57, a phenol-formaldehyde synthetic resin glue are described in Bulletin 169 published by the technical service department of Aero Research Ltd., Duxford, Cambridge.

Wild-Barfield Journal

Latest issue of the *Wild-Barfield Heat-Treatment Journal* contains an article on the use and abuse of the Spekker photo-electric absorptiometer. One of the chief causes of SPA failure, says the article, is stray light. Should all precautions fail to bring about any improvement it is quite likely that a white overall worn by the operator is the cause of the trouble.

Iodine References

The Chilean Iodine Educational Bureau has recently published Vol. 4. No. 3 of *Current Iodine Literature*, which is a list of references to articles and reviews on iodine which have appeared in the last few months. Divided into 10 sections, the book contains 199 references.

Careers in Plastics

A broadsheet on 'Careers in Plastics,' which has recently been distributed to schools in England, Scotland and Wales, is available from the Plastics Institute, 6 Mandeville Place, London W1.

Biological Stains Handbook

Biological Staining Methods by George T. Gurr the sixth edition of which is now available, has been revised since the previous edition and a number of additional methods have been included. The number of formulae has been increased. Copies may be obtained, price 5s (by post 5s 6d) from George T. Gurr Ltd., 136-138 New King's Road, London SW6.

Electronic Air Filters

Trion electronic air filters are described in a brochure from Electronic Division, Harris Engineering Co., York House, Browning Street, London SE17. It is claimed by the makers that this type of air filtration will eventually supersede most other types of air filters since it collects dust below 10 micron to 0.01 micron. The principle of the system is

that the suspended particles are given a positive charge as they pass through a high voltage ionising screen. These particles are then attracted and adhere to the collecting plates which form the negative elements of an electrostatic set up between a series of parallel plates. The collecting plates are cleaned periodically by washing with water.

Use of Rayleigh Interferometer Described

Contained in the February issue of the *Hilger Journal*, published by Hilger and Watts, 98 St. Pancras Way, London NW1, is an article on the use of the Rayleigh interferometer with volatile liquids by Dr. J. J. Kipling of Hull University. Dr. Kipling uses a Rayleigh refractometer to determine the relative amounts of liquids in a mixture and has a special cell, made by Hilger and Watts, to hold volatile samples. The instrument has been used for investigating adsorption by charcoal from mixtures of benzene and cyclohexane. The new cell has proved to be satisfactory even with the highly volatile tertiary butyl chloride.

BDH Now Supply Linde Molecular Filters

Linde molecular sieves types 4A and 5A for laboratory use are now available from the BDH Laboratory Chemicals Group, Poole, Dorset. A booklet published by the company describes these filters and indicates their possible laboratory and industrial uses. Linde molecular sieves are highly porous, dehydrated, crystalline zeolites in which the pores are of molecular dimensions and which therefore adsorb only those molecules which are small enough to enter the pore system. A possible suggested use is the separation of hydrocarbons where distillation is not feasible and other adsorbents are unsuitable or less efficient. Recoveries of 99.9 per cent purity have been obtained from a mixture of 95 per cent benzene and 5 per cent n-tetradecane after one pass.

Fire Risks of Electricity

'Electricity and the Fire Risk in Industrial and Commercial Premises' published by the Fire Protection Association, has been prepared with the guidance and assistance of an expert panel representing the electrical industry and fire protection. It deals with the general aspects of the problem and with some of the causes of electrical breakdown which may result in fire. It is intended for the benefit of those responsible for industrial and commercial concerns, so that they may satisfy themselves that their equipment is safe and is being properly maintained. It includes a bibliography of more detailed regulations and recommendations. Copies may be obtained free from the FPA at 15 Queen Street, London,

Clean Air Society

At a special meeting of the National Smoke Abatement Society on 11 April it was unanimously agreed that the society should seek incorporation as a company limited by guarantee and without share capital, and with the new name 'National Society for Clean Air.'

**NEW
VIKING
AGITATOR**

THE Viking agitator, manufactured by Viking Engineering Co., Hodge Lane, Salford 5, is designed to provide efficient agitation of liquids up to a viscosity of 300 centipoise.

Agitators of this range are intended for use in applications which are too heavy for clamp and portable types. They are available in powers ranging from one to 7½ h.p. at speeds of 720, 960 and 1,450 r.p.m. Where process conditions demand slower speed agitation a coaxial gear-reducing unit is inserted between the motor and the coupling housing.

In most cases a large diameter, short pitch marine type propeller is fitted. Turbines of several types and dispensers with stationary shrouds are available and are recommended where process conditions show that they are more suitable.

The Viking agitator is mounted on a British Standard flange on the side or head of the vessel. The unit is sealed in all positions against leakage of process fluids along the shaft of the machine.

Main functions of the Viking agitator are the mixing of miscible liquids, the dispersion of immiscible liquids, the dispersion and suspension of solids in liquids, the improvement of heat transfer between coils or jackets and liquids.

**AIR
INJECTION
SCAVENGING**

TO AVOID contamination of their high vacuum pumps by condensed vapours, Pulsometer Engineering Co. Ltd., Nine Elms Works, Reading, are fitting them with air injection scavenging.

Scavenging air enters the cylinder after the rotor blade has isolated the suction port. The air is then able to support a considerable amount of the water vapour without condensation occurring, particularly when the mixture is raised in temperature as a result of the pump's discharge action. A discharge temperature of 195°F, for example, would mean that each cubic foot of injected air carries 0.0265 lb. of water with it.

It is usual to limit the amount of injected air to a maximum of 10 per cent of the nominal swept volume of the pump. A 100 c.f.m. pump can therefore handle 0.0265 lb. of water per minute. The required discharge temperature is attained on the larger pumps by restricting the flow of cooling water but some models may need heating and the provision of slight back pressure.

When working against full air injection at maximum temperature, the pumps will, it is claimed, still maintain a high degree of vacuum from 0.1 mm to 0.3 mm depending on the particular model.

EQUIPMENT REVIEW

Chemical Plant : Laboratory Apparatus Safety and Anti-Corrosion Products

With reduced amounts of injection and more normal temperatures, high degrees of vacuum are achieved down to the normal ultimates of the pumps involved.

**HARD
METAL
SEALS**

STANDARD seals are now being supplied with hard metal opposing faces of the insert type by Crane Packing Ltd., a Tube Investments company, of Slough, Bucks. They are designed to handle abrasive services such as calcium sulphate slurry, suspension of powdered pumice, rouge, sandy water, with which carbon faces would have a short life.

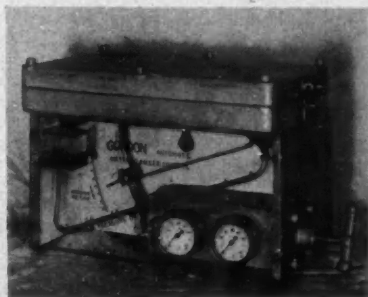
They are also said to be suitable for mildly corrosive conditions such as sea water, inorganic salt solutions and all types of boiler feed waters; all organic solvents, esters, ketones etc.; weak alkalis, e.g. sodium carbonate; but not suitable for concentrated acids. The special metal used is Coromant, which is the trade name for hard metals produced by Sandvik Steel Works Co. Ltd., Sweden.

Supplied only in matched pairs, these hard metal faces are at present available for type 1 and type 2 Crane standard seals and are interchangeable with the usual metal/carbon face combinations.

**OIL
CONTROL
SYSTEM**

A SIMPLE automatic metering control system, which may be more attractive than a conventional system, has been developed by James Gordon and Co. Ltd., Dalston Gardens, Stanmore, Middlesex. It has been designed for use where either simplicity combined with accuracy of the control gear, or low cost of installation, or both are of deciding influence in the choice of a system, as for instance, for control of medium or small oil-fired boilers.

When applied to a steam boiler, this system maintains steam pressure within



Gordon control system

narrow limits, by regulating the combustion air in relation to small variations in the pressure caused by changes in the demand for steam. It also regulates the oil supply to the burners in the required relation to the air quantity, despite change in the number of burners in use or changes in load.

Advantage of the SD control system is said to be its low initial cost. Savings in fuel which will result from its installation will pay for the apparatus in a short time.

**PORTABLE
DEMINROLIT
PLANT**

DISTILLED quality water without the use of heat or power is obtained from the new Permutit Mark V portable Deminrolit plant, produced by the Permutit Co. Ltd., Permutit House, Gunnersbury Avenue, London W4.

Basically, the Mark V consists of two columns of ion exchange material. 'Raw' water passes through the first column



Permutit Deminrolit plant

containing Permutit Zeo-Karb cation exchange material; mineral salts contained in the water are converted to their corresponding acids. These acids then pass down through the second column which contains Permutit De-Acide ion exchange material which absorbs acids. The demineralised, or de-ionised, water which results from this process is stated to be of distilled quality. Six gallons of such water can be supplied hourly. A dial type conductivity tester is also incorporated in the plant.

It is claimed that the Mark V portable is easy to operate and thoroughly reliable, the only running costs involved being the small quantities of acid and alkali required for regenerating the ion-

exchange materials. Since the Permutit Zeo-Karb and De-Acide are of proved quality and very robust, this portable Deminrolit plant has a long, effective life. It appears to be particularly suitable for laboratory and small process work.

HIGH PRESSURE VALVE

DESIGNED to handle large flows at very high pressures, a new solenoid valve, produced by Teddington Industrial Equipment Ltd., Sunbury-on-Thames, Middlesex, is suitable for use in a wide field of hydraulic, pneumatic and similar applications.

A two-way piloted piston type of valve for the control of chemically inert fluids or gases up to 1650 p.s.i., it can be made in sizes varying from $\frac{1}{4}$ in. to 2 in. bore and arranged either to open or close when energised. It has two main assemblies, the solenoid operated pilot valve and the piston type main valve unit.

Materials used for the valve have been specially selected to give long service. Precision machined from mild steel bar, the valve body is grooved to receive the tongued superstructure, which is secured by four screws. Non-corrodible materials have been used for all internal components and the piston assembly is constructed from stainless steel. A synthetic rubber valve disc is used.

IMPROVED HYDRAULIC LOADER

CHANGES in the design of the Muir-Hill 2-WL hydraulic loader affecting the standard bucket range and the bucket control linkage are announced by E. Boydell and Co. Ltd., Old Trafford, Manchester 16.

The Muir-Hill loader is now available with six different buckets ranging from the standard 1 cu. yd. 4 ft. 6 in. wide bucket to an over-size 3 cu. yd. nominal capacity full width bucket for coke loading, and including $\frac{1}{2}$ cu. yd. quarry type buckets, and a $1\frac{1}{2}$ cu. yd. full width light materials bucket.

All these buckets are based on the curved back design and it is claimed that their use, in conjunction with the roll back action provided, enhances the load getting ability of the machines as well as reducing transmission and tyre wear. A further advantage claimed is in load transportation, a heaped load in a level bucket being carried at any beam height with consequent improved driver visibility and machine stability.

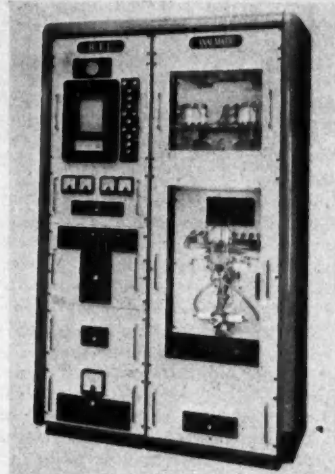
PLUG-IN RELAY SYSTEM

A PLUG-IN relay system, said to offer savings in cost, size, maintenance and delivery time of relay equipments, when compared with the use of bolted-in skeleton-type relays, has been developed by Clifford and Snell Ltd. The sole distributors, D. Robinson and Co., 58 Oaks Avenue, Worcester Park, Surrey, state that it is based on the use of a special plug-in relay, an easily installed and wired socket, and socket mounting frames.

The relay (type DA2600) is a durable,

robust unit measuring $2\frac{1}{2}$ in. \times $3\frac{1}{4}$ in. \times $4\frac{1}{2}$ in. Owing to the mounting system and their clean oblong shape, a number can be close stacked and need little room.

Each relay when plugged in is securely held by special pinch-type contacts in the socket, but in addition two captive screws are provided to lock it in during transit and use under vibration. A moulded Perspex cover protects against dust and accidental damage during maintenance.



Analmatic uranium analyser mark II demonstrated by Baird and Tatlock (London) Ltd., 14 St. Cross Street, London EC1, at the recent Physical Society exhibition (see CHEMICAL AGE, 23 March, page 501)

PACKAGED IMPREGNATION PLANT

TO MEET the current demand for small semi-automatic impregnation plant, capable of producing high quality components, General Engineering Co. (Radcliffe) Ltd., Station Works, Bury Road, Radcliffe, Lancs, have developed the type P14 packaged impregnation plant.

This plant is of single unit construction. Operation is simplified by the use of electromagnetically operated valves for all services, controlled from a single multi-position switch.

The instruments are mounted centrally on a control panel, enabling the operator to supervise and check the operation of the plant. Temperature control and pressure safety devices are provided.

Advantages listed by the manufacturers are: high vacuum and pressure impregnation; low thermal capacity giving rapid cycles; streamlined appearance, easily cleaned; sequence controlled operation; low capital cost; simple installation.

The plant is available in three forms suitable for various types of impregnants and processes. Assembly A is suitable for all 'ambient' type impregnants where it is unnecessary to heat or evacuate the impregnant storage tank. Assembly B is similar to type A, but with provision for heating the impregnant storage tank. Assembly C is similar to type B but with a special impregnant storage tank capable of being evacuated.

This type is suitable for oil and wax impregnants. Special provision is made for dehydration and deaeration before use.

QUICKLIFT SCREW CONVEYOR

A LIGHTWEIGHT, portable conveyor, capable of handling most types of granular free-running materials, is available from Opacol Ltd., 3-4 Sherwood Street, Piccadilly Circus, London W1.

Known as the Quicklift, this screw conveyor can handle between two and 10 tons per hour according to angle and materials. Basic unit weighs 33 lb., or 68 lb. with $\frac{1}{4}$ h.p. motor unit. The extended unit weighs 57 lb., or 92 lb. with motor.

All parts are interchangeable and extension pieces are available. The conveyor can be easily carried, assembled, operated and extended by one man.

THERMAGRID DISTILLATION TRAYS

A DEVELOPMENT of the Shell Turbogrid tray, the Thermagrid tubular distillation tray, is being marketed by Metal Propellers Ltd., 74 Purley Way, Croydon, Surrey. By replacing the normal bars or slotted plates of the Turbogrid tray, the Thermagrid tray is able to embody both mass transfer and heat transfer functions.

To meet the requirements of absorption, stripping or heat sensitive distillation processes, cooling or heating media can be passed through the tubes. Heat can thus be added or removed from specific trays in the column without diluting the process stream.

The surface of the Thermagrid tubes acts in a similar manner to the bars of a Turbogrid tray, forming a contact section for the liquid and vapour. The tubes can be round, oval or square to suit process requirements and can be supplied in almost all forms of material. Tubes of adjacent trays run at an angle of 90° to each other.

Shorter residence time per tray will usually be obtained in a Thermagrid column than in a bubble cap column, but tray spacing and the number of contacting stages can be adjusted to suit applications where this feature is of particular importance.

NYLON SAFETY SPECTACLE

CLAIMED to be a revolutionary approach to eye protection, the Ilex safety spectacle (No. 424), manufactured by Safety Service Co., 34a Stonebridge Park, London NW10, weighs only $\frac{1}{4}$ oz.

Frame of the spectacle is made from strong pliable nylon and is fitted with transparent protective shields. It is collapsible to fit into the wearer's pocket.

The spectacle is fitted with specially strengthened curved acetate lenses. A new lens shape has been designed offering extra coverage at the outer circumference where protection is vital. This new design affords a greater visual area and the manufacturers state that the shape will increase the wearer's acceptability of protective safety equipment.

● New president of the Federation of British Industries is **SIR HUGH BEAVER**, president-elect of the Institution of Chemical Engineers and managing director of Arthur Guinness Son and Co. Ltd. He succeeds Sir Graham Hayman who has retired after two years in office. Sir Hugh was from 1954 to 1956 chairman of the advisory council, Department of Scientific and Industrial Research and was chairman of the 1953/54 committee on air pollution.

● **MR. GEORGE C. H. CLARK** has resigned as a director of Bowmans Chemicals Ltd.

● **MR. A. J. STEVENSON**, a director of Stevenson & Howell Ltd., manufacturing chemists, has been appointed managing director of the company in place of Mr. V. J. TILLEY, who has retired from the board.

● Officers elected at the 9th annual meeting of the British Association of Chemists, Notts and Derby section, Celanese (Spondon) Group, were: chairman, **MR. A. L. KENNEDY**; secretary, **MR. K. ROGERS**; representative to section committee, **MR. F. HINDLEY**; committee, **MR. H. BATES**, **MR. F. HINDLEY**, **MR. A. J. CLAYTON** and **MR. E. T. YOUNG**.

● **MR. A. AISHEN**, works manager has been appointed a director of Richmonds Gas Stove Co. Ltd., Warrington. He began his career with Richmonds as a junior chemist 37 years ago and has successively held the appointments of chief chemist and technical manager.

● **MR. GUY FINLAYSON** of Glasgow, has accepted the appointment of an ore dressing expert with the United Nations Technical Assistance Administration. He will advise the Turkish Government in the field of ore dressing for a period of one year and will be based on Ankara.



G. Finlayson

● Among sectional officers appointed for the annual meeting of the British Association to be held in Dublin from 4 to 11 September, is **DR. J. W. COOK**, F.R.S., president of the chemistry section. Dr. Cook is vice-chancellor of Exeter University. Vice-presidents are professors J. Algar, T. G. Brady, P. O'Colla, W. R. Fearon, D. C. Harrison, C. Kemball, R. A. Raphael and J. Reilly and Dr. V. C. Barry. Dr. D. C. Martin, Royal Society, Burlington House, London, W1, is section recorder.

● **DR. F. LESTER**, head of the department of science at Hatfield Technical College, has been elected a Fellow of the Royal Institute of Chemistry, in recognition of his research work in electrochemistry. Educated at the City Boys' School, Leicester, and at the former University College, Exeter, Dr. Lester obtained Bachelor of Science and Doctor of Philosophy degrees at London University. Before going to Hatfield, Dr. Lester was

People in the NEWS

physical chemistry lecturer at the Royal Technical College, Salford, Lancs. **MR. A. K. BARNARD**, a member of Dr. Lester's staff, has been elected an Associate of the Royal Institute of Chemistry.

● **DR. JOHN FREDERICK JAMES DIPPY** is unable to take up the post of principal of the Bradford Technical College, owing to ill-health. Dr. Dippy, who was appointed to Bradford last September, was, for some years previously, head of the department of chemistry at the Chelsea Polytechnic.

● Known internationally for his work on nutrition, **PROFESSOR A. C. FRAZER**, of Birmingham University, president of the British Food Manufacturing Industries Research Association, has been appointed by the World Health Organisation as a member of its panel of food experts. Professor of medical biochemistry and pharmacology at Birmingham, he will hold his WHO appointment for five years.

● **DR. M. A. PHILLIPS**, author of the article which appears on page 673 of this issue, is a chemical consultant. He was educated at Roan's, Greenwich and Battersea Polytechnic where he studied under Dr. J. H. Kenyon. While working for May and Baker Ltd. he was one of the team that discovered M & B 693, perhaps the



M. A. Phillips

most famous of all the antibiotics. He is the author of many papers on pure and applied chemistry and chemical engineering and is a county councillor for Essex. Married, he has one son, a chemistry graduate of London University, who is now with the Ontario Research

● **PROFESSOR M. J. S. DEWAR** (London) was elected hon. secretary of the Chemical Society at the annual meeting held in Cambridge on 11 April. Other elections were: vice-presidents Professor Wilson Baker (Bristol), Professor R. D. Haworth (Sheffield) and Dr. L. E. Sutton (Oxford); council Professor A. J. Birch (Manchester), Professor A. W. Johnson (Nottingham), Dr. J. D. Loudon (Glasgow).

Professor R. S. Nyholm (London), Professor R. A. Raphael (Belfast), Dr. R. E. Richards (Oxford), and Dr. J. C. Tatlow (Birmingham).

● **DR. W. IDRIS JONES**, C.B.E., was re-elected president of the British Coal Utilisation Research Association for 1957-58 at the annual meeting on 10 April. **SIR JOHN CHARRINGTON** and **MR. HERBERT CHRISTOPHER**, J.P., were re-elected vice-presidents.



Dr. Arthur Key, senior chemical inspector, Ministry of Housing (left), with **Mr. Norman Salt**, hon. secretary of the Midland branch, Institute of Sewage Purification, at the branch's trade wastes symposium held in Birmingham University on 9 April and reported in 'Chemical Age', 13 April, page 637. Dr. Key was chairman of the symposium

● **SIR HAROLD HARTLEY**, G.C.V.O., F.R.S., past-president of the Institution of Chemical Engineers, has been elected president of the Society of Instrument Technology in succession to **MR. A. J. YOUNG**, B.A., B.Sc., who retires after the annual meeting on 28 May.

● **MR. J. T. MARSH**, M.Sc., F.R.I.C., who is to give the 1957 annual Mather lecture at the annual meeting of the Textile Institute on 24 April, will speak on 'Idea, invention and industrial progress.' A Fellow of the Institute, Mr. Marsh is a textile chemist of international repute for his work on finishing and the application of synthetic resins. Several of his books have been accepted as the standard work. He is responsible for the Mercer lectures of the Society of Dyers and Colourists and for the Dalton lectures of the Royal Institute of Chemistry.

● **MR. R. MARTIN RAIKES** has been appointed managing director of the Fullers' Earth Union.

Wills

SIR ALEXANDER STEWART, of Melbourne, Australia, head of Alexander Stewart and Co., chairman of Dunlop Rubber (Australia), Australian Fertilisers, and other companies, left estate in England valued at £2,201.

MR. ARTHUR MORTIMER, former secretary of the Wholesale Drug Trade Association, and during the late war Deputy Director of Medical Supplies to the Ministry of Supply, who died 26 January, left £2,845 net.

Commercial News

Brothertons Reduce Dividend on Lower Profit

GROUP PROFITS of Brotherton and Co. Ltd., Leeds, for 1956 were £279,542 (£421,997) before tax. After tax of £96,514 (£75,256), profits were £183,028 (£346,741). £100,000 (£250,000) is allocated to general reserve and £244,792 (£244,061) is carried forward. Final dividend of 7½ per cent (12½ per cent) is declared on ordinary, making 12½ per cent (17½ per cent).

A warning of much lower margins was given when the interim dividend was declared last September. Previous figures benefited from investment allowances on a capital programme completed in 1955 at a cost of more than £1,200,000.

Baldwin Instrument Co.

Entire issued share capital of Baldwin Instrument Co. Ltd. has been acquired by C. E. Harper Aircraft Co. Ltd., 62 New Broad Street, London EC2. Baldwin Instruments manufacture a wide range of electronic and nucleonic equipment including fluid power equipment.

F. W. Berk and Co.

Profit for F. W. Berk for 1956 was £251,913 before charging taxation, compared with £359,805 for 1955. After charging taxation the figures are £115,147 and £185,560. Interim dividend was 2 11/12 per cent and final dividend, 4 7/12 per cent, making a total for the year of 7½ per cent. Total last year was 10 per cent. The annual general meeting has been called for 16 May 1957.

The Distillers Co.

Directors of The Distillers Co. Ltd. have declared a dividend on preference of three 3 per cent, less tax, payable on 15 May, for the six months ended 31 March.

Bede Metal and Chemical Co.

A receiver has been appointed to handle the affairs of Bede Metal and Chemical Co. This follows an investigation by the directors.

A statement sent to shareholders by Lt.-Col. J. Cross Brown, chairman since November 1956, says that when the board came to consider the payment of an interim dividend it was decided, having regard to the very steep fall in the price of copper, that a dividend of only 3d a share should be declared. When the company's annual accounts for 1956 were being prepared the board was led to suspect that stocks might be inaccurately recorded.

A full investigation revealed there was a serious shortage of stock apparently spread over some years. This is attributed partly to the difficulty of making an accurate assessment and valuation of the company's complex stocks in process and partly to other causes which are the subject of continued investigation.

Figures prepared by the auditors were such as to make it essential to report the position to the bank which then appointed a receiver.

Cheshire United Salt

An extraordinary meeting of Cheshire United Salt Co. Ltd. will be held at 5-6 Bucklersbury, London EC, on 7 May at 3 p.m. to approve a change of name to Sifta Salt Ltd.

Saint Gobain (Chemicals)

Saint Gobain has declared a net dividend of Frs.550 per Frs.5,000 share for 1956 (same). The 830,460 shares issued in January and February of this year do not rank for this distribution.

Royal Netherlands Salt

Net profit for the Royal Netherlands Salt Industry for 1956 was Fls.6,815,000 compared with Fls.6,605,000 for the preceding year. A dividend of 12 per cent (same) was declared. Salt production was 626,000 tons. A new soda plant at Delfzijl, in which the company has a big interest, will start operating by the end of the year.

Royal Dutch-Shell

According to the Royal Dutch-Shell preliminary report, the impact of the Suez crisis was insufficient to reduce in the last quarter the rate of increase of the group's trade which had been established over the preceding period of the year.

There was, however, an effect on profits. The quarter's profits only rose by 4½ per cent following rises of 19 per cent, 18½ per cent and 12½ per cent in the first, second and third quarters.

In December last Lord Godber, chairman of Shell, said that increased costs would be recovered in selling costs

Market Reports

PRE-HOLIDAY LULL IN CHEMICALS

LONDON Although trade in the industrial chemicals market is less active the lull is no greater than is usual before the holiday. The volume of export inquiry continues on a good scale. Changes on the week have been few and prices in most sections of the market are steady with a firm undertone. Home and overseas demand for cresylic acid and creosote oil has been fully maintained in a firm coal-tar products market.

MANCHESTER Traders on the Manchester chemical market have reported a steady movement of supplies against contracts in the case of the alkali products and most other heavy chemicals, at least in the early part of the week, though in the latter part and in the opening days

to the greatest possible extent. It is anticipated that the first quarter's profit for 1957 will be back to normal.

Edwards High Vacuum

Net profit of Edwards High Vacuum, Crawley, for 1956 was £84,875 (£77,998). Final dividend of 11 per cent, making 15 per cent on trebled capital (15 per cent) is declared.

Wm. Butler and Co.

Group profit of William Butler and Co. (Bristol) Ltd., manufacturers of petroleum and detergents for 1956 was £87,957 (£73,177). Final dividend of 6 per cent (5 per cent) making 10 per cent (8 per cent) is declared.

LONDON GAZETTE

Voluntary Winding-up

THE ARTHOL MANUFACTURING CO. LTD., chemical manufacturers, registered office, Sealand Road, Chester. By special resolution, 29 March. R. E. Jones, 8 Chapel Walks, South Castle Street, Liverpool 1, appointed liquidator.

Notice of Intended Dividend

W. T. BRUCE AND CO. LTD., registered office, 16 Wood Street, Kingston-on-Thames, chemical manufacturers. Last day for receiving proofs, 25 April. Liquidator, R. P. Booth, Kimberley House, 14-17 Holborn Viaduct, London.

Applications for Import Duty Drawback on Grease

The Board of Trade are considering an application for drawback of import duty in respect of grease and tallow used in the manufacture of stearine fatty acids, oleine fatty acids and cloth oils and wool oils containing not less than 70 per cent by weight of oleine fatty acids for export. Representations, in writing, must be made by 24 April to the Tariff Division, BoT, Horse Guards Avenue, London SW1.

Change of Address

The technical sales and service department of Acheson Colloids Ltd. moved on 1 April to 70 Hill Street, Richmond, Surrey (telephone: RICHmond 2066 and 2634). The accounting section remains at 18 Pall Mall, London SW1.

of next week, due to the holidays, business will be at a standstill. In most sections of the fertiliser market deliveries have been on a satisfactory scale. The light coal-tar products generally are meeting with a steady demand and selling prices are lower.

GLASGOW A rather better week's trading can be reported from the Scottish heavy chemical market and for most of the week business showed signs of improvement. A varied range of chemicals was demanded, both in regard to contract and spot deliveries. Considerable interest has again been shown in fertilisers, while a good volume of inquiries was received for the export market, which remains active.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents),' which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 2s 6d including postage; annual subscription £6 6d.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

On sale 22 May or as soon as possible thereafter.

Pigmented articles from fusible synthetic linear polymers. Farbenfabriken Bayer AG. 729 584

ACCEPTANCES

Open to public inspection on 22 May.

Compositions for waterproofing cement and allied materials. British Thomson-Houston Co. Ltd. 775 868
System for building up pressure in a fluid medium from a low-pressure fluid supply. Walker, W. J., and Seawright, R. M. F. 775 655
Treatment of textile materials. Boehme Fettchemie Ges. 775 976
Fluid-pressure control systems. Mercier, J. 775 756
Regeneration, by distillation, of oils used for gas washing. Woodall-Duckham Construction Ltd. 775 978
Electrolytic process for preparing titanium metal. Spence, P., and Sons Ltd. [Addition to 713 446.] 775 870
Arc-melting of high melting point metals and alloys. Imperial Chemical Industries Ltd., and Atkins, R. 775 979
Composition for control of moulds and like fungi and bacteria. Keogh, E. P. Proprietary Ltd. 775 981
Hydrogenative reforming of gasoline and other naphtha fractions. Houdry Process Corp. 775 961
Catalytic fume incineration. Suter, H. R., and Ruff, R. J. 775 549
Hydrochlorides of amino-alkyl-sulphonic acid chlorides. Ruhrchemie AG. 775 663
Treatment of polymeric materials. General Electric Co. 775 874
Plasticised polymethyl methacrylates. Imperial Chemical Industries Ltd. 775 764
Esters. Geigy Co. Ltd. 775 560
Production of substances which increase capacity for reaction of liquids, vapours or gases. Equipro Equipment and Process Co. Inc. 775 875
Expanded plastic sheet material. Imperial Chemical Industries Ltd. 775 562
Reaction of hydrocarbons with oxygen or oxygen-containing gases. Hydrocarbon Research Inc. 775 666
Esters of the steroid series. Organon Laboratories Ltd. 775 565
Apparatus for contacting liquids with vapours. Imperial Chemical Industries Ltd. 775 567
Coated textile fabrics. Imperial Chemical Industries Ltd. 775 878

Coated polyester fibre fabrics. Imperial Chemical Industries Ltd. 775 879
Protecting ferrous metal articles from atmospheric corrosion. Imperial Chemical Industries Ltd. 775 571
Dyeing and printing fibres of polyacrylonitriles. Ciba Ltd. 775 766
Viscose process and products produced thereby. Rayonier Inc. 775 883
Means for releasing compressed gas from a container therefor. Sparklets Ltd. 775 678
High strength corrosion-resistant bodies and production thereof. American Electro Metal Corp. 775 993
Copolymers and their application in bonding textiles to rubber. Dunlop Rubber Co. Ltd. 775 884
Dyestuff preparations and dyeing or printing processes using them. Ciba Ltd. 775 885
Durene production. Esso Research and Engineering Co. 775 686
Catalytic conversion of sulphur containing hydrocarbon mixtures into products of lower boiling point and sulphur content. Gulf Research and Development Co. 775 999
Polyacrylonitrile films, threads, filaments, fibres and the like. Courtaulds Ltd. 775 887
Polymerised ϵ -caprolactam. Veb Thüringisches Kunstfaserwerk W. Pieck Schwarza. 775 888
Organic oxygen-containing compounds. Badische Anilin- und Soda-Fabrik AG. 775 689
Porous calcium silicate products. Owens-Illinois Glass Co. 775 582
Cellulose xanthate. Courtaulds Ltd. 775 893
Electrodeposition of titanium, zirconium, hafnium, tantalum, vanadium, niobium, chromium, molybdenum and tungsten. Horizons Titanium Corp. 775 585
Flexible tubing. Rubber Improvement Ltd., and Lewis, J. 775 894
Production of resorcinol. Distillers Co. Ltd. 775 896
Photographic developers. Imperial Chemical Industries Ltd. 775 692
Coatings for self-adhesive tapes and the like. Adhesive Tapes Ltd. 775 693
Salts of substituted alkylene-diamines. Irwin, Neisler and Co. 775 897
Detergent compositions. Hedley, T., and Co. Ltd. 775 588
Secondary alkylxylenes. Standard Oil Co. 775 695
Ethyl toluenes. Standard Oil Co. 775 590
Antibiotic - activity - possessing fungi. Aktiebolaget Kabi. 775 901
Flame shield for inflammable or explosive fluids. SAS Soc. Applicazioni Secondite. 775 905
Lacquers and coatings. Badische Anilin- und Soda-Fabrik AG. 775 906
Recovering nickel-free cobalt solutions from liquor containing nickel and cobalt. Chemical Construction Corp. 775 788
Catalytic cracking of hydrocarbon oils. Esso Research and Engineering Co. 775 790
Plasticised cellulose ethers. Monsanto Chemical Co. 775 907
Detergent compositions. Imperial Chemical Industries Ltd. 775 791
Polyiodinated phenoxy-fatty acids. Schering Corp. 775 811
Regenerating stationary beds of catalyst. Gulf Research and Development Co. 776 022
Recovery of heat from hot gases. Pilo, C. W. 775 600

High styrene-low diene resins of high heat softening point. Goodyear Tire and Rubber Co. 775 971
Thermoplastic moulding composition containing polychloroprene. Goodyear Tire and Rubber Co. 775 972
Thermoplastic moulding composition containing cold GR-S. Goodyear Tire and Rubber Co. 775 973
Isomerisation of maleic acid to fumaric acid. Monsanto Chemical Co. 775 912
Dimensionally stable textile materials. American Viscose Corp. 775 913
Antibiotic purification and compounds. Pfizer Corp. [Addition to 718 032.] 775 916
Recovery of phenols. Distillers Co. Ltd. [Addition to 739 907.] 775 813
Mass spectrometers. General Electric Co. 776 029
Emulsions for covering solid materials with a thin adherent hydrophobic layer. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 775 917
Control unit for controlling the supply of gas under pressure to a gas supply line. Stamicarbon NV. 775 920
Treating iron-oxide bearing materials. Koppers Co. Inc. 775 747
Coking iron oxide-coal mixtures. Koppers Co. Inc. 775 748
Processes and apparatus for drawing crystalline bodies, such as semiconductor bodies. Siemens-Schuckertwerke AG. 775 817
Removing dust from gases. Bot Brassert Oxygen Technik AG. 775 818
Vat dyeing and printing of cellulose textile materials. Steimlé, J. F. 775 820
Production of substituted 1, 2-diphenyl-3, 5-dioxo-pyrazolidines. Geigy, J. R., AG. 775 925
Epoxidised fatty acid diacetoglycerides. Swern, D., and Knight, H. B. 775 714
Preparation of lactams. Du Pont de Nemours, E. I., and Co. 775 794
Manufacture of pure urea. Inventa AG für Forschung und Patentverwertung. 775 933
Streptogramin and process for production. Merck and Co. Inc. 776 035
Resins derived from dihaloalkanes and polyalkylene polyamines. American Cyanamid Co. 775 721
Styrene-isobutylene type copolymers. Esso Research and Engineering Co. 775 936
Allyl substituted acetylene compounds. Farbenfabriken Bayer AG. 775 723
Forming or restoring a platinum-type catalyst. Houdry Process Corp. [Divided out of 775 961.] 775 962
Flexible cellular material. Goodyear Tire and Rubber Co. 775 938
Self-priming centrifugal pump. Gorman-Rupp Co. 775 623
Anthraquinone derivative. Farbenfabriken Bayer AG. 775 802
Cellulose-ester compositions. Celanese Corp. of America. 775 804
Accelerating sedimentation of dispersions. Badische Anilin- und Soda-Fabrik AG. 775 805
Steroid compounds. Pfizer, C., and Co. Inc. 775 943
Modified melamine formaldehyde condensation products. Monsanto Chemical Co. 775 808
Preparing an extrusion material by mixing a granular superpoly-amide and a dihydroxybenzene. Naamlooze Vennootschap Onderzoekingsinstituut Research. 775 822
Vulcanisation of 2-chlorobutadiene-(1, 3) polymers or copolymers. Farbenfabriken Bayer AG. 775 823
O-carbamyl-D-serine. Laboratoires Français de Chimiothérapie. 775 946

Treatment of threads, fibres or yarns of synthetic high polymers for purpose of minimising their capacity for becoming electrically charged. Vereinigste Glanzstoff-Fabriken AG. **775 947**

Endo-dextranase by an *Aspergillus* mould. Commonwealth Engineering Co. **775 948**

Method and apparatus for the supply of hydrocarbon charge to moving mass hydrocarbon conversion processes. Socony Mobil Oil Co. Inc. **775 824**

Amides of N-alkyl piperidine monocarboxylic acid and N-alkyl pyrrolidine α -monocarboxylic. Aktiebolaget Bofors. **775 749** and **775 750**

Metallic zinc from zinc sulphides. Metallges. AG. **775 949**

Plasticised vinyl resin composition. Union Carbide and Carbon Corp. **775 825**

Perfluoro amino compounds and quaternary derivatives. Minnesota Mining and Manufacturing Co. **775 950**

Catalytic elements. Suter, H. R., and Ruif, R. J. [Divided out of **775 549**.] **775 550**

Apparatus for producing highly dispersed mists and fumes. Steinkohlenbergwerke Hannover-Hannibal AG. **775 734**

Removing mercaptans and other sulphur compounds from hydrocarbon oils by treatment with hydrofluoric acid. Naamlouze Vennootschap de Bataafsche Petroleum Maatschappij. **775 953**

Dyestuffs of the isothiazolanthrone series and process for their manufacture. Sandoz Ltd. **775 957**

Nitroso derivatives. Compagnie Francaise des Matieres Colorantes. **775 829**

Pyridyl-(3)-methyl methyl amine. Hoffmann-La Roche, F., and Co. AG. **775 831**

Stigmasterol material. Eastman Kodak Co. **775 835**

Valves for the control of flow of fluid. Fortune, R. **775 837**

Device for maintaining constant the volumetric flow of a gaseous medium. Aktiebolaget Svenska Fläktfabriken. **775 840**

Preparation of sarcosine. Colgate-Palmolive Co. **775 738**

Catalytically reforming gasoline and other naphtha fractions. Houdry Process Corp. [Divided out of **775 961**.] **775 963**

Spray Unit for Vitreous Enamels Installed by Escol

INSTALLATION of a Ransburg electrostatic spray unit for applying vitreous enamels is being carried out at the works of Escol Products Ltd., Paisley Works, Swains Road, London SW17.

This installation, claimed to be the first of its type in Europe, is being carried out in collaboration with Henry W. Peabody (Industrial) Ltd., who, as representatives for this process in the UK and Western Europe, have installed units for applying materials other than vitreous enamel.

Escol will act as consultants to Peabody, assisting and giving technical guidance in connection with the preparation and application of vitreous enamel by this method. This will include development work on frits and the preparation of materials.

Demonstration and service work will be carried out on potential users' products in this installation and facilities available will enable work to be carried out not only on the application of the vitreous enamel, but also the drying and fusing.

Boron Tribromide Now Being Produced In UK

BORON TRIBROMIDE, British made, is now available in experimental quantities state Borax Consolidated Ltd. This compound could play a part in the development of new types of boron-containing fuels for rockets and guided missiles.

Possible applications include the production of catalysts for use in the petrochemical industry and of compounds for promoting the synthesis of silicones and similar compounds. The new compound is similar in many respects to the boron trichloride already used in industry, but is expected to be easier to handle in a number of chemical producing processes.

Boron tribromide could be used to prepare exceptionally pure elemental boron having a purity better than 99 per cent, compared with the purities of the order of 97 per cent, previously obtained.

CDA Open New Offices and Display Room

New offices and display room of the Copper Development Association were opened by Viscount Chandos at 55 South Audley Street, London W1, on 9 April.

Applications of copper or copper alloys in the chemical industry are exhibited in one of the eight display recesses of the display room. In addition to accommodating the staff the new headquarters include a boardroom, library, and small ancillary metallurgical laboratory.

Corrosion Resistant Tin and Zirconium Alloys

The US Atomic Energy Commission have recently patented (British Patent No. 764,285) a series of new zirconium alloys containing tin. From 1.8 per cent to 4.5 per cent of tin and between 0.3 per cent and 3.3 per cent of molybdenum are contained in the alloys.

It is claimed that these alloys have a high tensile strength at elevated temperatures and excellent corrosion resistance. Very good ductility is also claimed. Main use of these alloys will be in constructional elements of nuclear plant.

Will

MR. JOHN ROSS, of 6 Winton Circus, Saltcoats, former commercial manager of the explosives group of Imperial Chemical Industries Ltd., who died on 8 November last, left personal estate in England and Scotland valued at £5,266 18s 2d. Probate has been confirmed in favour of Catherine K. Ross, of the same address, and Mrs. Susan P. Thruston, of 55 Kaye Lane, Almondbury, Huddersfield.

ICI Extend Procion Range with Unique Dyestuffs

Imperial Chemical Industries Ltd., dyestuffs' division, have increased their range of Procion dyestuffs to 10 with the introduction of a bright greenish-yellow, a new brilliant red, reddish blue, a bright turquoise blue and two brilliant greens. These six new procions like the earlier four, are stated to be characterised by their brightness of shade, excellent fastness properties and great simplicity of application.

Their principal value will be in the dyeing and printing of cellulosic fibres.

BIP Acquire Polyester Process

British Industrial Plastics Ltd. have acquired from Filon International Establishment exclusive British Commonwealth rights for the manufacture of glass reinforced polyester sheeting by a continuous process. The process was developed by Filon Plastics Corporation.

CHEMICAL LEADWORK

Fabricated Lead Sheets and Pipes. Homogeneous interior Lead lining of flanged mild steel tubes, bends, and tees.

W. THOMASON & SONS, LTD.
Walton Works, Great Moor Street, BOLTON

Established 1875

Telephone 306

SAFETY FIRST

THE "OLDBURY" PATENT
CARBOY DISCHARGER
will empty and elevate up to 50 feet
the contents of any carboy, bottle or
vessel, and complies with all the
conditions of the Factory Act of 1937.

KESTNER'S

5, Grosvenor Gardens, Westminster, London, S.W.1

ACTIBON

. . . the highly activated
Carbon for ALL
Decolourising purposes

THE CLYDESDALE CHEMICAL CO. LTD.

142 QUEEN STREET · GLASGOW C.1

Phone: CENTral 5247/8

Grams: "Cactus" Glasgow

Acid handling PORTABLE PUMPING UNITS

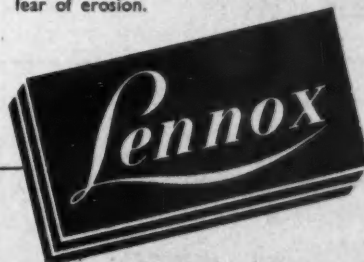
FOR REGULAR OR AUXILIARY WORK

Also available Vertical,
Glandless, and Horizontal
Pumps



Lennox Portable Pumping Units are invaluable in every Factory where Chemicals are employed, either as a pumping set for regular production work or as a standby to replace other Pumps undergoing repair. The Pump is easily wheeled to the required position and can be connected with flexible pipe in a few minutes. It will empty Store Tanks, Pickling Tanks, Sludge Sumps, Tank Wagons, Carboys, Process Vessels, or any other receptacle for liquid, and deliver the contents wherever required.

Difficult corrosives, such as Nitric, Sulphuric, Acetic Acid, etc., can be handled without the slightest difficulty, and even gritty substance such as chalk slurry can be pumped without fear of erosion.



LENNOX FOUNDRY CO. LTD.

Tantiron Foundry, Glenville Grove, London, S.E.8

Classified Advertisements

CLASSIFIED RATES: All sections 5d. per word. Minimum 8/- . Three or more insertions 4d. per word. Box Number 2/- extra. Up to mid-day Tuesday for insertion same week.
SEMI-DISPLAY: 30/- per inch. Three or more insertions 25/- per inch.
SUBSCRIPTION: Annual Subscription of 52/6 brings 52 weekly copies of **CHEMICAL AGE** direct to your address from the printer (postage paid by the publishers), and a copy of **CHEMICAL AGE YEAR BOOK**.
COMPANY MEETINGS AND REPORTS: £12.12.0 per column. Three column measure (approximately 360 words).

EDUCATIONAL

A.M.I.CHEM.E.—More than one-third of the successful candidates since 1944 have been trained by T.I.G.B. All seeking quick promotion in the Chemical and Allied Industries should send for the T.I.G.B. Prospectus. 100 pages of expert advice, details of Guaranteed Home Study Courses for A.M.I.Chem.E., B.Sc.Eng., A.M.I.Mech.E., A.M.I.Prod.E., C. & G., etc., and a wide range of Diploma Courses in most branches of Engineering. Send for your copy today—**FREE**. T.I.G.B. (Dept. 84), 29, Wright's Lane, London W.8.

SITUATIONS VACANT

UNIVERSITY OF DURHAM KING'S COLLEGE, NEWCASTLE-UPON-TYNE LECTURER IN CHEMICAL ENGINEERING

The Council of King's College invite applications for a Lectureship in Chemical Engineering. Applicants should preferably hold a degree in Chemical Engineering, Chemistry, or Engineering. The commencing salary will be determined at an appropriate point on the Lecturers' scale which, from 1st August, 1957, will rise to a maximum of £1,650 per annum with family allowance and F.S.S.U. benefits.

Twelve copies of application, together with the names of three persons to whom reference may be made, should be addressed not later than 6th May, 1957 to the undersigned, from whom further particulars may be obtained.

G. R. HANSON,
Registrar of King's College

CHEMICAL PROCESS SHIFT SUPERVISORS required. Minimum educational qualification—Higher National Certificate in Chemistry or Engineering. Good salaries for men with wide experience in the chemical or petroleum industry. Housing assistance or house available in some cases. Please apply, stating age, details of education, training and experience, to the General Manager, Laporte Chemicals Limited, Baronet Works, Warrington.

LABORATORY CHEMISTS & ANALYSTS required. Minimum educational qualification—Higher National Certificate in Chemistry. Please apply stating age, details of education, training and experience, to the General Manager, Laporte Chemicals Limited, Baronet Works, Warrington.

FOR SALE

DRYING MACHINES for Sale. 1 Dunford & Elliott Rotary Louvre Drier, equipped with cylinder heater, centrifugal fans, cyclones, etc. 1 American ADT Steam Drier, 4 ft. diam., 15 ft. long. Inquiries to DEWSNAP, 10 CALVERT AVENUE, LONDON, E.2.

FOR SALE: continued

MORTON, SON AND WARD, LIMITED, STAINLESS STEEL VESSELS

VESSELS of all shapes and sizes, jacketed or unjacketed—with stainless steel mixing gear to requirements; also stainless steel storage tanks and vacuum vessels.

"MORWOOD" "U"-shaped TROUGH MIXERS—up to 2 tons, in stainless steel, with agitators, scroll or paddle type, jacketed or unjacketed.

Stainless Steel TROUGHS, TANKS and CYLINDERS made to requirements.

These items can also be fabricated in mild steel.

JACKETED PANS

100g., 150g., and 200g., new, in mild steel, for 100 lb. p.s.i. w.p.—with or without mixing gear.

3 cwt. **TROUGH MIXERS** by CHALMERS and GARDNER—stainless steel-lined troughs.

50g., 75g. and 100g. heavy duty **MIXERS** by FALLOWS and BATES. Agitators driven through bevel gears from fast and loose pulley.

200g. cast-iron **JACKETED MIXING VESSEL** with nickel-chrome impeller type agitator driven through bevel gears from fast and loose pulley.

AIR COMPRESSORS

THREE 30 c.f.m. at 100 lb. pressure, water cooled, automatic overloads, with or without motors.

AIR RECEIVERS MADE TO REQUIREMENTS. PUMPS Selection of new MONO and second-hand Pumps in stock—2 in. to 5 in.

Inquiries Invited.

MORTON, SON AND WARD, LIMITED,
WALK MILL,
DOBCROSS, NEAR OLDHAM,
Lancs.

Phone Saddleworth 437

Brand New COCHRAN Vertical and ECONOMIC Self-contained STEAM BOILERS in stock, also all sizes reconditioned and guaranteed. List on request.

STAINLESS STEEL TANKS, PANS, CONDENSERS, PLATES, VALVES AND COCKS. Very wide selection.

4 new **ALUMINIUM CONDENSERS**, 14 ft. long, 2 ft. 3 in. dia., 386 tubes $\frac{1}{2}$ in. o.d.

FRED WATKINS (BOILERS) LTD.,
COLEFORD, GLOS.

Phone: Coleford 2271/2.

Morton Whisking Machine container fitted water jacket 17 in. diam. by 24 in. deep. Fast and loose pulleys, 14 in. by 3 in. Exhaust Fan by Musgrave. 18 in. impeller, 17 in. suction, 13 in. by 13 in. delivery. R.O. bearings. Fast and loose pulleys, 6 in. by 3 $\frac{1}{2}$ in.

THOMPSON & SON (MILLWALL) LIMITED,
LONDON, E.14.
TEL. EAST 1844.

BOX NUMBERS: Reply c/o "Chemical Age" • Bouverie House • Fleet Street • EC4

FOR SALE: continued

600

TABLETTEING MACHINES

Rotary Multi Punch TABLETTEING Machine, by Manesty, type R.S.1. Output 320 per min. tablets up to $1\frac{1}{2}$ in. dia. Motorised 400/3/50.

Single punch TABLETTEING Machine. Adjustable stroke and filling depth to $\frac{1}{2}$ in. max. For tablets approx. $\frac{1}{2}$ in. diam. Belt drive.

Daniels No. 3 Tableting Machine. Motorised 400/3/50 and complete with Guards, Isolators, Dies, Tools, etc.

Manesty B.2 Rotary TABLETTEING Machine. For tablets up to $\frac{1}{2}$ in. diameter., capacity 400 per min. Max. depth fill $\frac{1}{2}$ in. Stainless steel hopper (spare hopper available). Motorised 400/3/50.

Stokes & Manesty single punch TABLETTEING Machine. For tablets up to $\frac{1}{2}$ in. diam. Capacity 64 per min. Max. depth fill $\frac{1}{2}$ in. Motorised 400/3/50.

Manesty R.B.B.3 Rotary TABLETTEING Machine. For tablets up to $\frac{1}{2}$ in. diam. Capacity, 1,010 per min. Max. depth fill $\frac{1}{2}$ in. Two stainless steel Hoppers. Motorised 400/3/50.

Manesty "F" single punch TABLETTEING Machine, output 85 tablets per min., filling depth $\frac{1}{2}$ in. for tablets $\frac{1}{2}$ in. diam. Motorised 400/3/50.

Stokes RD3 Rotary TABLETTEING Machine, suitable for tablets up to 1 in. diam., capacity 300/350 per min. Max. filling depth $\frac{1}{2}$ in. Fitted stainless steel hopper and motorised 400/3/50. Complete with new set of 15 punches and dies.

Single punch machine by Walker. Max. filling depth $\frac{1}{2}$ in. Adjustable stroke to max. $1\frac{1}{2}$ in. Max. diam. tablet $\frac{1}{2}$ in. F. and L. pulley driven.

GEORGE COHEN SONS & CO., LTD.,

WOOD LANE, LONDON, W.12

Tel.: Shepherds Bush 2070 and

STANNINGLEY, NR. LEEDS

Tel.: Pudsey 2241

BAKER-PERKINS No. 17 Mixer. Tilting trough 53 in. by 43 in. by 32 in., with two 'Z' blades.

ALUMINIUM TANK—600 gal., on wheels.

TORRANCE CHANGE PAN MIXER—20 in. by 15 in.

VACUUM SHELF DRIER—4 ft. 7 in. by 3 ft. 3 in. by 3 ft., with three steam-heated shelves.

No. 4 KEK MILL—with 5 h.p. A.C. motor.

GARDNER 'E' SIFTER MIXER—150 lb. and 'C' 60 lb.

U-TROUGH MIXER—50 gal., tilting type.

WINKWORTH MACHINERY LTD., 65 High Street, Staines. Telephone 1010.

600

COMPLETE VACUUM DRYING PLANT by Scott, comprising horizontal band drier approx. 35 ft. by 6 ft., with service feed hoppers, shaker feeder, condensate receiver for hotplates, vacuum augmentor, kek mill, screening and finished material hoppers, tailings elevator, wet and dry vacuum pumps. Powered by flame-proof motors. Drier of the seven-band type, but has operated with three bands only.

Twin cyl., steam-heated Drum Drier by H. Simon. Rolls 40 in. by 28 in. diam. 100 lb. w.p., running in plain bearings with steam inlet and condensate outlet. Doctor knife to each roll. Steam jacketed TROUGH MIXER by Dobson & Barlow, mixing trough 53 in. by 43 in. by 46 in. deep. Twin glanded "Z" blade agitators, motorised 400/3/50. Power op. tilting.

20 in. diam. Centrifuge by Broadbent. Lift out self-balancing basket $10\frac{1}{2}$ in. deep, back 260 lb. 1,000 r.p.m. M.S. interlocking cover. Motorised 400/3/50.

Plate and frame FILTER PRESS by Johnson, plates 24 in. sq., pyramid surface. Individual discharge.

80 gal. S.J. m.s. Boiling Pan with stainless steel lining. 32 in. dia. by 29 in. $1\frac{1}{2}$ in. run off. Hinged lid. Jacket 35 lb. w.p.

NEW STAINLESS STEEL STORAGE TANKS AND VESSELS, with capacities ranging from 8 gallons to 1,000 gallons.

NEW PORCELAIN AND SILEX LINED BALL MILLS, with capacities ranging from 9 gallons to 260 gallons.

GEORGE COHEN SONS & CO., LTD.,

WOOD LANE, LONDON, W.12

Tel.: Shepherds Bush 2070 and

STANNINGLEY, NR. LEEDS

Tel.: Pudsey 2241

FOR SALE: continued

PHONE 98 STAINES

S.S. Washing Machine with Gas-fired Boiler.

S.S. Jacketed Pans—38 in. by 36 in. (2) 36 in. by 30 in., 33 in. by 27 in. and 26 in. by 23 in. deep.

S.S. Lined Autoclaves—6 ft. by 3 ft., 100 w.p.

S.S. & Chrome Emulsifier/Mixing Arms— $\frac{1}{2}$, $\frac{1}{4}$, 1 and 2 h.p.

S.S. Mitchell Portable Electric Stirrer—A.C.

7,000 & 4,500-gall. Cylindrical Pressure Tanks.

Manesty Electric Pelleting Press.

(6) 1,000-gal. O/T Rec. Tanks—10 ft. by 5 ft. by 3 ft. 6in.

Pumps, Disintegrators, Crushers, Condensers, Refiners, Stills, etc.

HARRY H. GARDAM & CO. LTD.

CHARCOAL, ANIMAL AND VEGETABLE, Horticultural, burning, filtering, disinfecting, medicinal. Also lumps, ground and granulated. THOMAS HILL-JONES, INVICTA WORKS, BOW COMMON LANE, LONDON, E.3 (TELEPHONE: EAST 3285).

WANTED

WANTED any quantity of Wool Wax Residue. Regular buyers. Send sample with quotation. BOX NO. C.A. 3528, CHEMICAL AGE, 154 FLEET STREET, E.C.4.

WANTED TO PURCHASE BIRLEC LECTRODRYER BE40 MODEL. BOX No. 3536, CHEMICAL AGE, 154 FLEET STREET, LONDON, E.C.4.

WORK WANTED & OFFERED

PULVERISING of every description of chemical and other materials. Collections, storage, deliveries. THOMAS HILL JONES, LIMITED, INVICTA WORKS, BOW COMMON LANE, LONDON E.3 (TELEPHONE: EAST 3285).

CHEMICAL PROCESS DEVELOPMENT LTD.

invite inquiries from Companies requiring small-scale plant facilities, particularly in the filtering, sieving, centrifuging, drum drying and homogenising fields.

Complete laboratory facilities also available.

220-222 ELGAR ROAD,
READING.

GRINDING, CRUSHING AND GRADING
FINE GRINDING LTD.,
BLACKHOLE MINE, EYAM
TELEPHONE: EYAM 227

CRUSHING, GRINDING, MIXING and DRYING for the trade.
THE CRACK PULVERISING MILLS LTD.

Plantation House
Mincing Lane,
London, E.C.2.

PATENTS & TRADE MARKS

KING'S PATENT AGENCY, LTD., (B. T. King, A.M.I.Mech.E., Patent Agent), 146a, Queen Victoria Street, London, E.C.4, ADVICE Handbook, and Consultation free. Phone: City 6161.

PATENTS & TRADE MARKS: continued

The Proprietor of Patent No. 598602 for "Method of Producing Copolymer Resins and Products Derived therefrom", desires to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

THE INDENT GAZETTE

An average of 220 enquiries for goods from export merchant buyers, including Chemicals of all descriptions, appear weekly in The Indent Gazette. Specimen copy sent on application to 154 Fleet Street, London, E.C.4.

**PAPER BAGS
POCKETS
COUNTER ROLLS**

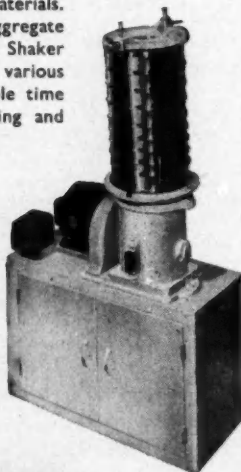
**STONEHOUSE
PAPER & BAG MILLS
STONEHOUSE, GLOS.**

accurate**particle size analysis**

Vibration alone or hand shaking is not sufficient for accurate particle size analysis of materials. Vibration alone is more inclined to aggregate the particles. The Inclyno Test Sieve Shaker ensures perfect segregation of the various particles' sizes in the shortest possible time having a double movement of gyrating and jolting the test material.

The Inclyno Test Sieve Shaker is an essential unit for all laboratories and is standard equipment in many government laboratories, nationalized industries and industry in general.

Operated by a fractional h.p. motor and supplied complete with automatic time switch covering test periods up to 60 minutes. Models available for all sizes of standard test sieves.



INCLYNO

TEST SIEVE SHAKER

Write or telephone
Crawley 25166 for
List IN 904

THE PASCALL ENGINEERING CO. LTD.
GATWICK ROAD-CRAWLEY, SUSSEX

JAMES D. BIRCHALL

**The Classification of
Fire Hazards and
Extinction Methods**

Second printing 8s. (post paid)

Ernest Benn • Fleet Street • London

**CALDER VALE
GLASSWORKS LTD**

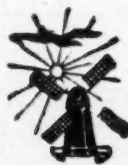
Calder Vale Rd. • Wakefield • Yorks

TEL. WAKEFIELD 3857

● SPECIALISTS IN ●

**Carboys • Demijohns
Winchesters**

CROMIL & PIERCY LTD.



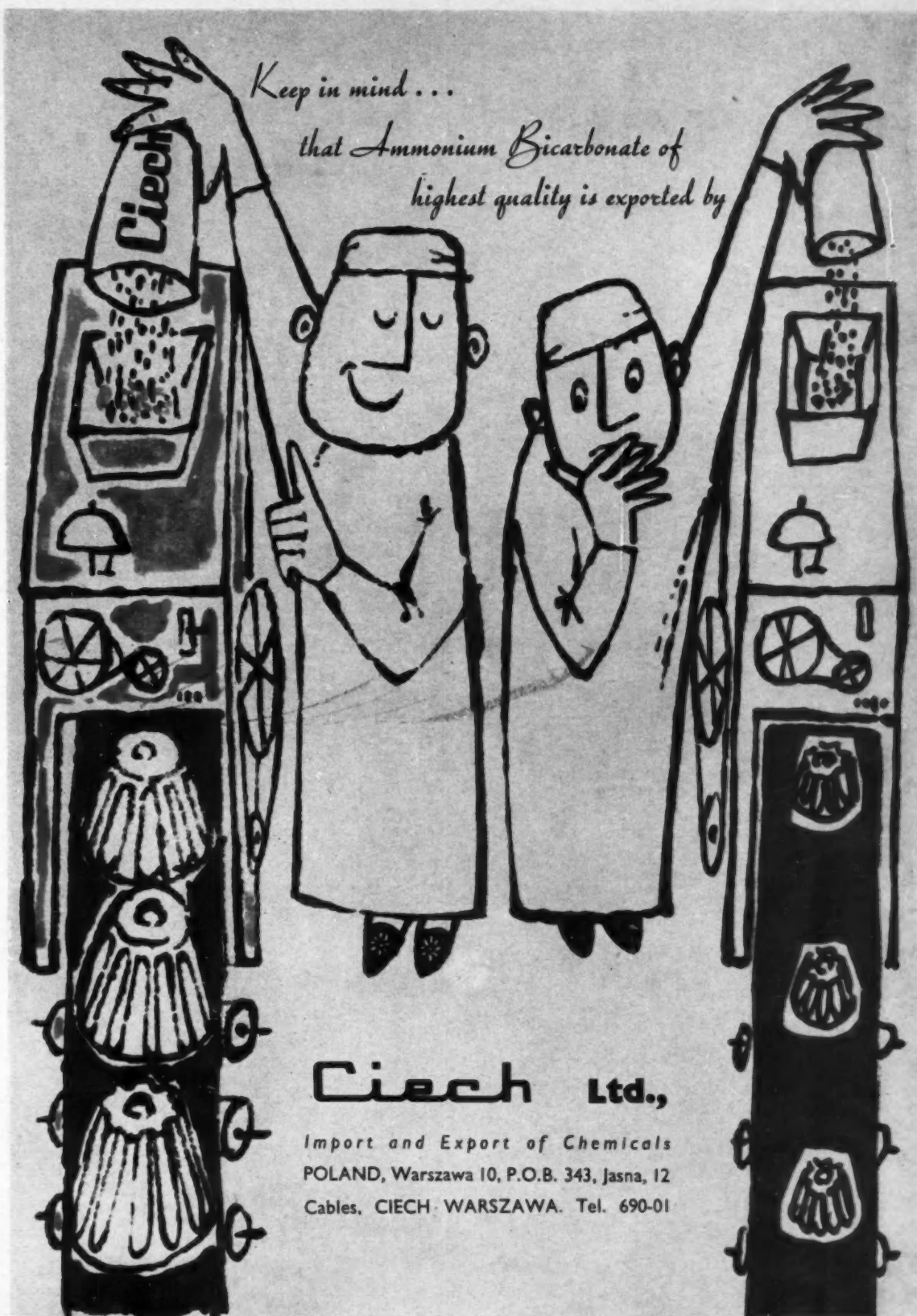
REGD. CROMIL

GRAPHITE
IN ALL FORMS

**MILBURN HOUSE
"E" FLOOR
NEWCASTLE-ON-TYNE**

Tel.: 2-7761

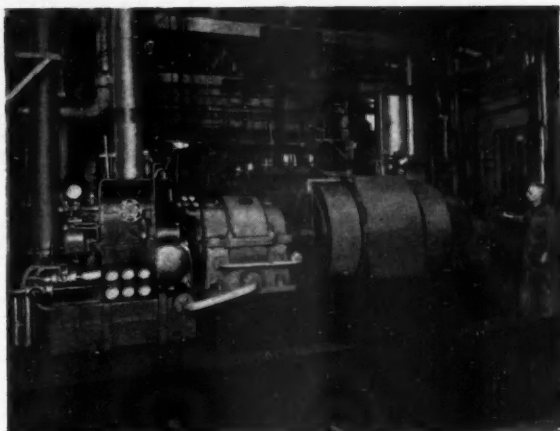
Keep in mind . . .
that Ammonium Bicarbonate of
highest quality is exported by



Ciech Ltd.,
Import and Export of Chemicals
 POLAND, Warszawa 10, P.O.B. 343, Jasna, 12
 Cables, CIECH WARSZAWA. Tel. 690-01

Small Back Pressure Turbines

and Fuel Economy



The photograph shows one of two 1,250kW geared back pressure turbo-generators installed in the power house of the Trafford Park works of Metropolitan-Vickers providing steam for factory heating and processes at the minimum fuel cost. Similar machines varying from 100kW to 2,000kW are in service in various industries. Larger direct-coupled back pressure turbo-generators with outputs up to 30,000kW, and for the highest initial steam conditions in commercial use, have been manufactured for industrial undertakings requiring large quantities of low or medium pressure steam at the highest overall economy.

METROPOLITAN-VICKERS

ELECTRICAL CO LTD TRAFFORD PARK MANCHESTER 17

Member of the A.E.I. group of companies

B/L401

ACID & ALKALI RESISTING LININGS

IN
**BRICK, TILE, P.V.C.
&
RUBBER
FOR ALL TRADES**

**COMPLETE PLANTS
FOR PICKLING
FUME EXTRACTION
&
EFFLUENT
TREATMENT**

PICKLING TANKS 90 FEET LONG WORKING SUCCESSFULLY

RIZISTAL

ALL BRITISH GUARANTEED PRODUCTS



**MANUFACTURERS
OF
SILICA, LATEX,
CASHEW, FURANE, &
POLYESTER RESIN CEMENTS**

**SKYMMIT & BRUSH-ON
IMPERVIOUS COATINGS**

**P.V.C. & STAINLESS STEEL
FABRICATIONS FOR ALL PURPOSES**

**JOHN L. LORD & SON
WELLINGTON CEMENT WORKS
BURY, LANCASHIRE**

TELEGRAMS: "CEMENT"
TELEPHONE: BURY 617